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Australian Model Engineering

LOCOMOTIVES, TRACTION & STATIONARY ENGINES, BOATS, WORKSHOP, PRODUCTS, CLUB NEWS & EVENTS, REVIEWS

In This Issue:

- ☑ Build A Double Acting Small Steam Engine
- ☑ Eccentric Turning
- ☑ 7¼" Straddle Type Passenger Car

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Bob Campbell from Brisbane attends to the fire in his 3" scale Allchin traction engine at the annual Traction Engine Rally in Canberra a couple of years ago. To find out where to see these engines at this year's rally, turn to page 29. Photo: David Proctor

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Comment

AME — the independence of the press

Most people who were at the AALS Convention in Cobden (and probably, by now, most who were not) would be aware that there has been a bit of a debate going on lately relating to footwear worn by members of the public when enjoying facilities in our clubs. By the time you read this I would imagine the vote will have been taken and the decision made on how the AALS Code of Practice addresses footwear.

One issue emerged in this debate which concerns *AME* editorial policy which I feel should be clarified without further delay. There were a couple of occasions where people involved in this debate attempted to get *AME* to take a stand in favour of their particular argument. It matters little which side or sides they were on, but I will point out that they were not any of the leading players in the debate. This is not the first time I have been approached about having *AME* push a particular internal viewpoint on an issue. Let me say here and now, ***it ain't gonna happen!***

In my view *Australian Model Engineering* is a medium of communication between participants in the various hobbies which come under the title of model engineering, aimed mainly at spreading news, views, things to do and entertainment. Essentially, the aim is to promote and foster the hobby. **This can only be done by remaining impartial** — to take sides is always going to alienate someone's view, no matter how well founded, and that leads to resentment and a consequent lack of communication.

Taken one step further, in order to remain totally impartial, the production and editorial policy of this magazine have absolutely no connection with AALS, AMBSC, any of our advertisers or any club, and that will certainly remain the case as long as this editor is on the job.

Recently, a company search was conducted on *AME* under circumstances whereby I expect the indivual concerned was trying to establish a link between AME and the AALS, or an officer of the AALS, in an attempt to further his own particular cause. Sure, there are some in the hobby who are connected with the magazine in that they put their hands in their pockets to raise the cash to float the magazine in the first place. They did this as a service to the hobby, without ever expecting to get a return on their "investment". These people are the company's shareholders and to date their only reward has been the satisfaction of a good read (at least I hope so). These people are mostly active members of the hobby, but they have no input at all into what *AME* does or does not print. *(Actually, it's hard enough to even get an article out of most of them!)*

So, if in future you want *AME* to take a stand on your side in any issue of contention, don't be disappointed — *AME* does not and will not take sides.

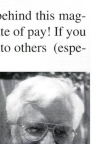
David Proctor

Join us in a great hobby!

If this is your first issue of *Australian Model Engineering*, welcome!
In successive issues we cover many topics centred on that wonderful process of model engineering — alias *tinkering*.

If you're new to model engineering as well as to our magazine, you'll benefit from getting together with other model engineers — we're good at sharing ideas and saving each other money! If you don't have any contacts, start by looking in Club Round-up to find a club that's near to you. Many of our readers have discovered people with similar interests literally just around the corner.

Helping other model engineers is the simple idea of the volunteers behind this magazine. Our readers write items for us — for the same (non-existent) rate of pay! If you have ideas, opinions or techniques that you feel would be interesting to others (especially from the newcomer's angle), please drop us a line. We can send you a useful guide and help with preparing artwork or editing.



I hope you'll enjoy the great fellowship that makes our hobby special, and that you'll support our advertisers — after all, they help pay our bills!

David Proctor
Managing Editor

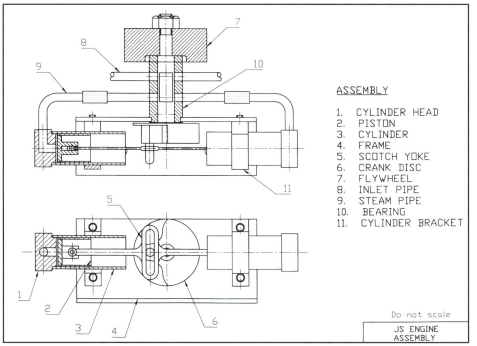
A Double Acting Small Steam Engine

by John Symons

Drawings for publication from the author's originals by Peter O'Loughlin

The small steam engine shown here was developed from a simple engine described in *Australian Model Engineering* Issue 81. This model uses the same crankshaft/rotary valve system as in the original single acting engine but utilises two horizontally opposed cylinders to simulate double acting operation. A Scotch Yoke was ideal for this configuration and adds interest to the project.

As an intending constructor you could consider first whether any changes should be made to accommodate materials you have to hand, or which might improve its appearance. Also the dimensions (or design) could be varied if desired. I have used Loctite 609® throughout, knowing that it is practically impossible to separate joints so made. You may wish to use other alternatives.



Construction

Construction will be expedited by making the components in the following order:- (4) Frame, (11) Cylinder Brackets, (3) Cylinder, (1) Cylinder Head, (5) Yoke (2) Piston (10) Bearing, (7) Flywheel, (6) Crankshaft, (9) Steam Pipes.

We can begin by marking out the **frame** on a piece of $^1/_{16}$" brass sheet, being sure to lightly centre pop the ends of the lines so they can be relocated later on. Now drill all holes and clean up before bending.

Next we make the brass **cylinder brackets**, which allow the engine to be assembled and dismantled. Mark out the centre lines for the $^1/_2$" hole (centre pop for later recovery of the lines) and the outline of the bracket. If other means are not available the bracket can be shaped by first drilling the $^1/_2$" hole in a piece of $^1/_4$" brass then setting it on a short $^1/_2$" rod held in a drill vice. By rotating the brass a series of close spaced $^1/_8$" holes can be drilled around the central hole. Thereafter, sawing and filing will produce the desired shape. NOTE: The $^1/_2$" holes should be a sliding fit with the cylinders.

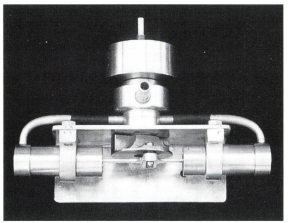
Now comes the interesting part, the location and tapping of the 5BA mounting holes. Pass a $^1/_2$" rod through both brackets, locate them on the frame using the centre lines, clamp the assembly and drill and tap. Remove most of the thread in the frame, clean up burrs and tighten up bolts. (This procedure ensures the alignment of the cylinders). It would be advisable to mark the tops of the brackets and the adjacent frame to ensure correct relocation.

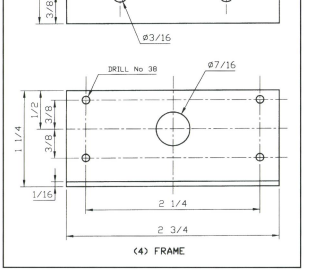
The **cylinders** are simply two lengths of $^1/_2$" OD x $^7/_{16}$" bore brass tube. The bore can be polished with 800 grit W&D paper on a piece of dowel.

The brass **cylinder heads** should be a push fit in the cylinders and can be permanently fixed in position with Loctite 609. The hole for the steam tube should also be a push fit.

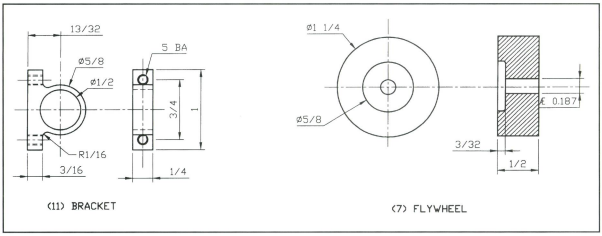
The **connecting rod/yoke** is perhaps the most laborious item in this project. The material can be hard brass or steel $^1/_8$" thick, which allows the yoke a more realistic appearance, but entails much filing, or the item may be made from $^1/_{16}$" material. Before proceeding it is necessary to decide on crank and gudgeon pin dimensions. I had $^1/_8$" and $^1/_{16}$" rollers from small bearings, so they were used.

Mill or drill and file the slot first to allow the crankpin to slide freely without play. The rod can now be sawn and filed to shape. The cross section is only a guide. The main concern is to reduce the weight to a minimum to assist balancing.





The **piston skirts** are turned from 1/2" MS bar to a sliding fit in the cylinder, which is used as a gauge. Drill the 25/64" hole first. If desired the skirt can be made 1" long and used as a lap prior to parting off. If three small grooves are turned in the skirt they will trap liquid and act as seals.



The **piston heads** fit flush with the top of the skirt BUT this is not done until the connecting rod is fitted. Turn down the end of a 1/2" bar to 3/16" dia. As shown, remove from the chuck, drill the 1/16" hole, then saw and file the slot, allowing some side clearance for the conrod. Next turn down to a light push fit in the skirt, and part off. Fit the conrod and make sure there is free movement, then fix the assembly into the skirt with the head exactly flush using Loctite 609.

The **bearing** is made from brass bar. For a single inlet, (the original design used two inlet pipes), first make the collar, filing a flat for the spigot and Loctiting it in position. Now you can turn the outside of the bearing for a sliding fit in the collar and with a fine tool tip scribe circumferential and longitudinal lines to locate the steam holes and the groove, which can now be machined.

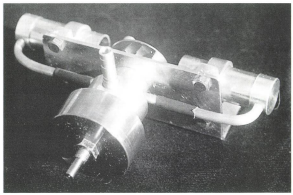
Next drill and ream the bore. Then the 7/16" step should be made to a force fit in the frame, protruding about 0.01" to ensure the crank disc clears the frame. The nominal 1/8" holes can now be drilled to provide a push fit for the tubing used. DO NOT MOUNT THE BEARING YET it is to be used as a gauge when machining the crankshaft.

The **flywheel** is next turned from MS bar. The hole may be drilled as the crankshaft will be turned to suit.

The **crankshaft** is turned from 1 1/4" MS Bar with the shaft a close yet free running fit, preferably lapped in the bearing. Aim for a clearance of less than 0.001". The length, 1.005" should be adjusted to give around 0.005" and play when assembled. This is done when the end of the shaft is turned down for the flywheel. DO NOT PART OFF until the flats are filed and the thread cut.

Reverse in the chuck (protect shaft) and face off to the required thickness. Drill and counter sink 1/8" hole — beware of breaking through into the inlet cavity. It will be necessary to drill down at the end of the exhaust flat to intersect the 1/4" hole. Drill or mark for the crankpin — a 1/8" pin is suggested. It may be a force fit or Loctited into a close fitting hole.

If the **engine is to drive something** extend the crankshaft by 3/8" and turn to 1/8" dia.

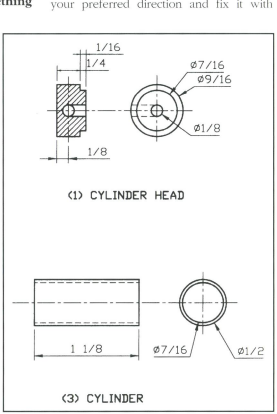


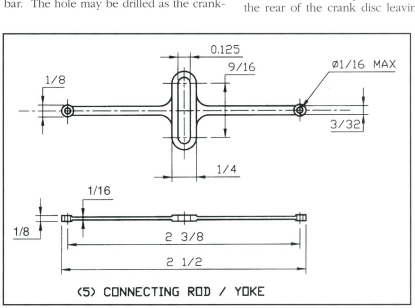
Balancing the engine

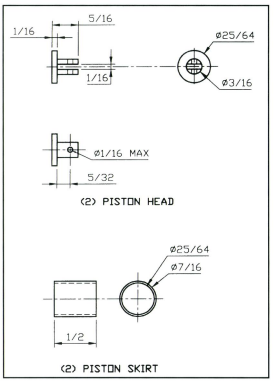
Balancing the engine will require removal of material either as shown or, preferably, by milling as much material as possible from the rear of the crank disc leaving about 1/32" thickness at the front of the disc and a section 1/8" thick where the crankpin is to be pressed in. In the prototype this provided a good balance but there was no surplus material to remove.

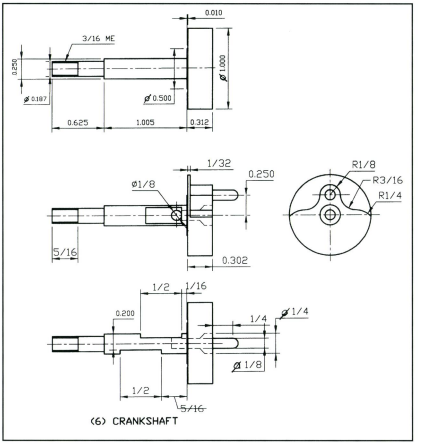
Getting it all together

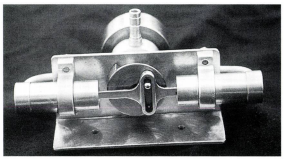
First place the collar assembly on the bearing and rotate to point the spigot in your preferred direction and fix it with

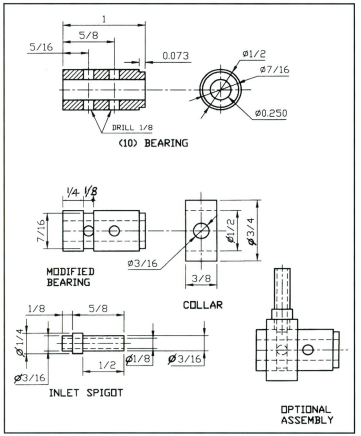












Loctite. Now chamfer the $^{7}/_{16}$" hole in the frame to ensure seating of the bearing and rule a pencil line parallel to the centre line. If a $^{1}/_{8}$" rod is passed through the steam holes it can be used to align the bearing which can be gently pressed into the frame — a drop of Loctite applied before. Run through the bearing and insert the crankshaft. Mount the flywheel and lightly tighten the nut. Cross fingers and place the con rod assembly in position.

Now feed the cylinders into position and restrain them whilst rotating the flywheel. If all is well things should move freely, but if they don't you will have to decide on appropriate action.

Now we will make the steam pipes. First sit the cylinders in their correct positions by pushing them outwards by piston movement and then $^{1}/_{16}$" more with the steam holes facing backwards. Then, if you are absolutely certain the position and alignment are correct apply Loctite to the joint at the bracket.

Take a 3" length of $^{1}/_{8}$" soft copper tube and find some steel wire at least 3/4 the diameter of the bore. Grease the wire and insert it in the tube. Allowing extra length on each end bend the tube around a rod to achieve the desired shape. If there is noticeable flattening careful hammering on a piece of wood is needed. Cut the wire at the short end and pull it through from the other. With one end sitting on the bearing place the other about $^{1}/_{8}$" into the cylinder head and measure the amount to be cut off.

The pipe must now be cut to length leaving a $^{5}/_{16}$" gap to be joined with a flexible tube as shown on the assembly, so that the cylinders can be removed. Push this tube onto one half pipe and Loctite the head joint.

The end is nigh! To avert the possible disaster caused by Loctite "wicking in" and bonding crankshaft to bearing, it is wise to unbolt the cylinder brackets and remove the crankshaft. THEN install the two half steam pipes, clean out the bearing with cloth, run the reamer through, lubricate all moving parts with a light oil and re-assemble.

Rotate the engine by hand, it should not require any force. A little "running in" at a moderate speed should free it up so that it will tick over on 1—2 psi.

Steam Chest

with Dave Harper

Hi there steam fans, and welcome to another selection of steamobilia. It seems that several modellers are producing families of little engines based on the little radial valve engine now known as 'the Rev Dyson' engine.

The Dyson engine family grows!

Dave Adams has sent some photos of his 'family' from NSW: **photo 1** is the whole family, from L to R the rotary, which Dave says will turn with a big blow, but goes easier on the air compressor! Then there's the twice size version using the suspension bush from a Morris Minor for the cylinder plus a 3-part fabricated conrod. On the right is the opposed twin version and in front a tiny half sized version of the original.

Photo 2 is a side view of the rotary which shows the layout better while **photo 3** is of an interesting little engine called the *Husky*. This is a single acting uniflow engine built from an article in a very old magazine.

Dave sent me a copy of the article which has full instructions, drawings and photos which should make it easy to build, especially as it's all fabricated and uses no castings. Yet another one on file that is available if anyone would like a copy

Yet another variant of the Dyson engine has been built by Bedford Smedley of South Australia — this time a V-twin. **Photos 4 and 5** show Bedford's very well made model. Bedford has also provided a set of drawings for this engine which I will attempt to redo on the computer so we can publish them for you. Bedford also sent some photos of his other models — **photo 6** shows his Bolton No 27, a twin cylinder engine with bores of $^{15}/_{16}$", on the left, and a Gage TVR1, an American pre-machined kit of a twin cylinder, reversing engine with Hackworth valve gear.

The Bolton engine was built to power a neat model pilot launch built by Bedford's younger brother Geoff. **Photo 7** is of Geoff holding the hull and showing its size and neat construction. **Photo 8** shows the completed model floating in the family pool. Thank you Dave and Bedford for sharing your models with us — keep them coming, readers!

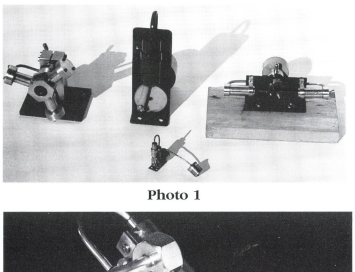
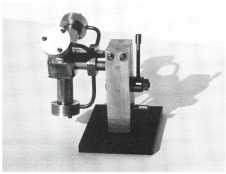


Photo 1



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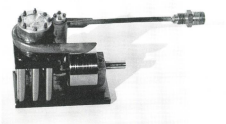
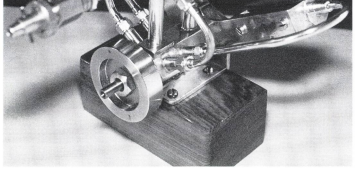


Photo 3

More pumping engines

I was recently given a fascinating little booklet on the Severn Tunnel and its pumping engines. The booklet was published by the Swindon Engineering Society c1954, and tells the story of the major tunnel that was driven under the River Severn to allow the Great Western Railway to make a direct rail connection from the west of England to Wales and it's coal fields and docks. The length of the tunnel is 4 miles 624 yards, and it was built between 1873 and 1886.

As if building a tunnel of that length wasn't difficult enough the diggers ran into a major spring when almost halfway across and were faced with the problem of



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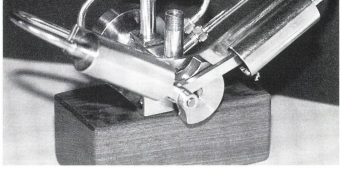

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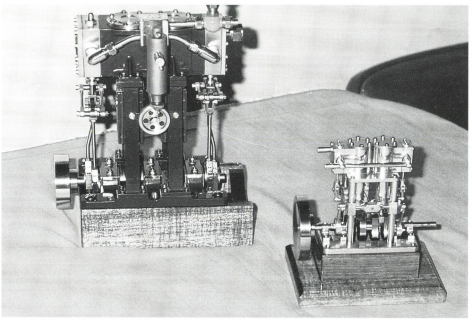


Photo 6

Photo 7

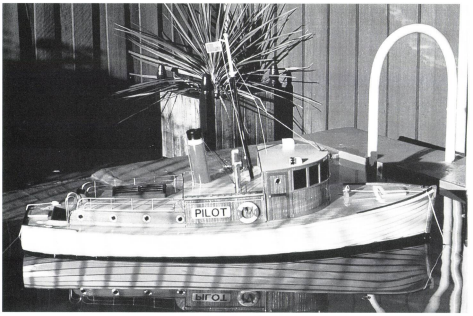


Photo 8

pumping huge quantities of water out of the workings on a permanent basis. To achieve this a huge pumping station was built able to cope with the flow of about 20,000 gallons per minute.

To do this six beam pumping engines were installed in the one 'house', set radially around a central pump well. The steam cylinders were 70" dia and 10ft stroke, the water pumps being 34" dia.

Another eight beam engine/pump units were in a separate engine house to handle the other water inflow to the tunnel. In addition a tandem compound engine with bores of 21 and 42 inches and 39 inch stroke was installed to drive a centrifugal fan to ventilate the tunnel. To provide steam for all these engines no less than 17 Lancashire boilers were installed in three boiler houses, most of which were hand fired.

This really is an epic tale of Victorian engineers fighting mother nature all the way, and I hope the photos I've reproduced from the booklet are suitable for reproduction. (*They are reasonable ... Ed.*)

Figure 1 is a diagram of the tunnel, **figure 2** is of one of the pumps. **Figure 3** is of the beams in the main pump house, each one weighing 20 tons! **Figure 4** is a fascinating shot of the valve gear and parallel linkages and **figure 5** is the fan engine, a much later design with drop valves.

The question now arises — are any of these magnificent steam engines still in existence? The Severn tunnel is still in use, I believe, but I can't imagine steam pumps still being used. Does anyone know whether any of the steam engines have been preserved? And are they still pumping the outflow from that spring after all these years?

More steam history

While looking out for information on Lancashire boilers I came across some notes that turned up a while ago. I'm very grateful to whoever sent them to me, but I'm afraid I don't have any record of who that was. The notes are titled *A Brief History of the Development of the Lancashire Boiler*, and I believe they are of sufficient interest to reproduce in full. Here they are:.

The Lancashire boiler was originally introduced by William Fairbairn in 1844. The design was a derivative of Trevithick's Cornish boiler. The Cornish boiler had a single internal flue and was long in proportion to its diameter, to provide the internal flue with a large area of heating surface.

Fairbairn's boiler had two internal flues and a length approximately three times its diameter. The internal flues contained the furnaces and also acted as expandable stays. Additional gusset stays were riveted to the boiler shell and the end plates. The early boilers were constructed of wrought iron plates, lap jointed using rivets, and arranged in strakes to provide the required length. Up to ten strakes might have been

constructed which increased the potential for leakage with length. Some early boilermakers tended to cling to the old idea that length was necessary to extract the maximum amount of heat from the furnace flues and some Lancashire boilers were built nearer to the Cornish ratio of 4:1.

The furnace flues were constructed of rolled wrought iron rings riveted at the lap joint. A number of rings were riveted together to provide the length. The ends were flanged and these, too, were riveted to the boiler end plates. The circular construction of the furnace flues improved their ability to withstand pressure. This led some boilermakers to reduce the thickness of the flues with sometimes disastrous results. The furnace flues were a weak point and the early designs were subject to damage due to oxidisation, or grooving and cracking at the roots of flanges because of expansion and contraction. Most boiler explosions occurred, or were preceded by a collapse of the furnace tubes.

At first boiler pressures were low, by modern standards — less than 20psi to about 30psi. Boiler feed water could be injected by using a standpipe to provide enough head to overcome the boiler pressure; this would require a head of 50ft. Water level was sometimes detected using a float having a wire attached which passed through a gland in the boiler top. The wire would pass over a pulley and have a weight fastened to the end. The position of the weight corresponded to the height of the water inside the boiler. Alternatively, a pair of vertical tubes set at high and low water levels, with test cocks, were used.

A safety valve would be a simple plug held down by a weighted lever. These valves were frequently subjected to abuse, or altered through ignorance, which allowed the boiler pressure to rise above its safe limit. Then, as now, operator ignorance was perhaps the greatest contributor to accidents.

One of the first Lancashire boilers to be commissioned was that for Hope Mills, Manchester in 1844. This had a diameter of 9ft and operated alongside a similar boiler 10ft by 24ft long and together they

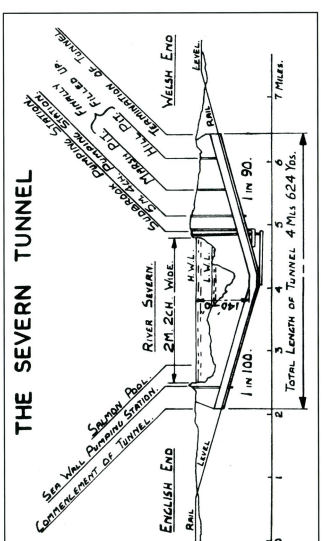


Figure 1

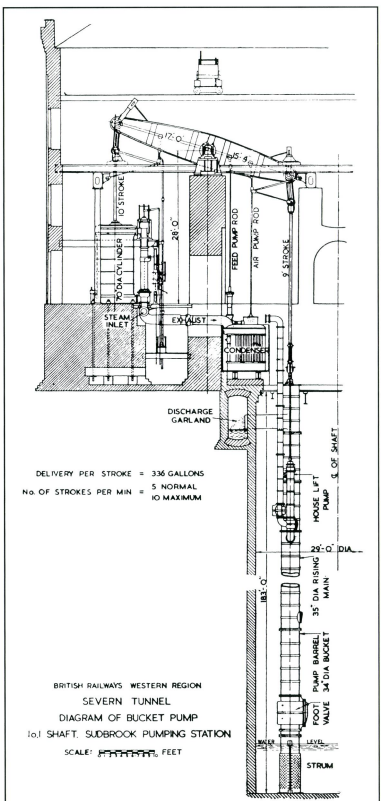


Figure 2

Figure 3

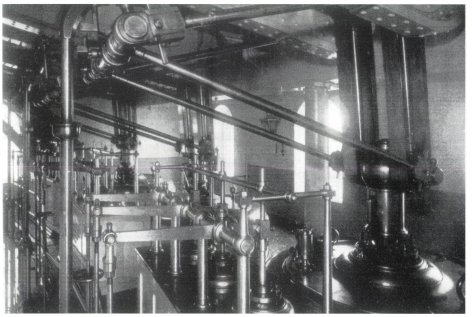


Figure 4

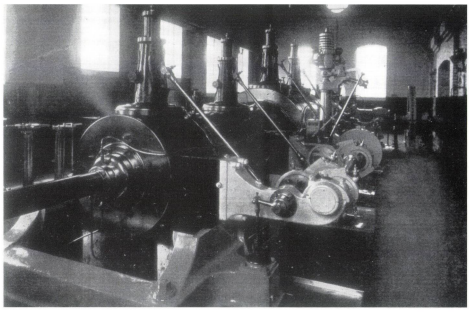


Figure 5

powered a Boulton and Watt engine rated at 60hp. The two boilers were able to load the engine continuously at 145 gross indicated hp with a coal consumption of 6lb/hr per ihp.

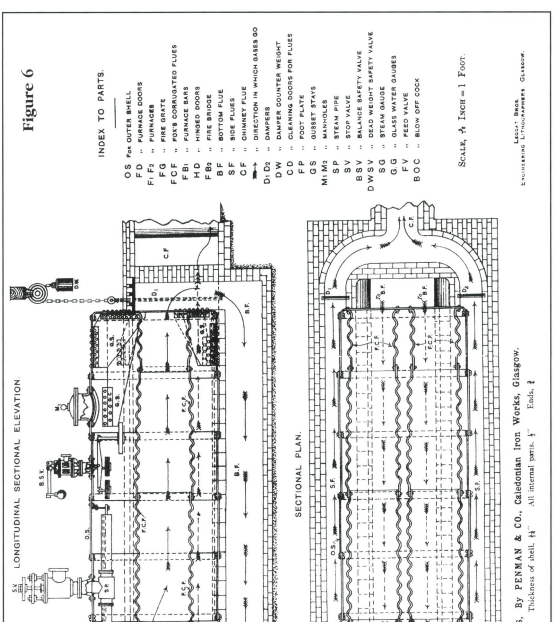
Boilers were set on fire-clay seats and flues were constructed of brickwork with fire-brick lining. Coal was loaded into the furnace flues and ignited. The hot gasses passed over the fire-brick bridge and along the tubes to the downtake. From the downtake the hot gasses were directed under the boiler, through the flame bed, then were divided to pass back along the boiler sides to the main flue. Dampers, suspended in the side-flue exits to the main flue, were raised or lowered to regulate the rate of draught.

New developments in steam engines soon led to a call for higher steam pressures and some of the existing boilers were operated above their design limits. This resulted in a series of boiler explosions which increased in number to scandalous proportions. A parliamentary bill of 1871 merely recommended that, irrespective of whether a boiler explosion resulted in death or injury, the Coroner should be informed. In 1882 an Act of Parliament (Boiler Explosions Act) came into force introducing the imposition of accident insurance and this meant that regular boiler testing and inspection was required. Prior to this Act boiler explosions had averaged 50 per annum killing 50 to 70 persons compared to an average of 20 railway passengers killed. The new Act required ALL boiler explosions to be reported and investigated by the Board of Trade inspectors.

Improvements to the Lancashire boiler followed rapidly. The furnace flues were constructed of 'Adamson' rings which had expansion collars between the individual riveted sections. Sometimes 'Galloway' tubes were installed in the back portion of the furnace flues to provide extra heat transfer in the 'coldest' part of the flue. Although these were prone to maintenance problems they were quite popular.

Later developments produced 'Fox's' corrugated flues which had even better expansion characteristics along with improved heat distribution due to a greater surface area and the turbulance that the corrugations induced in the hot gasses as they passed through the tubes.

After the year 1900, boiler end plates could be formed from thicker metal using hydraulic presses. This produced a convex profile with improved strength which allowed the gusset stays, and more than 500 rivets, to be dispensed with. At this time also, boiler plate became available in larger sizes and boilers could be constructed with just three strakes. The hydraulic press also allowed furnace flues to be swaged into the boiler ends eliminating the use of rivets at these points. This technique, with corrugated flues, considerably reduced the stress at the weakest part of the boiler.



In the 1920's the fire hole in a typical Lancashire cotton mill might have contained up to 20 Lancashire boilers including two on standby and two undergoing maintenance. At the height of their popularity there were more than 100,000 Lancashire boilers operating safely at pressures up to 200psi. End of notes.

I've dug out an excellent diagram (**Figure 6**) of a Lancashire boiler from Prof. Jamieson's excellent book *Steam and Steam Engines*, a 1910 edition of which I am proud to be the custodian.

More on boiler explosions

Reading these notes reminded me that I have a copy of another booklet published about 1906 on the multiple boiler explosion at Distington, a blast furnace in the NW of England.

The booklet was published by The National Boiler and General Insurance Co Ltd, obviously with the object of educating people to the dangers of boiler explosions. Next issue I'll precis parts of the booklet as it shows remarkable investigative powers by the inspectors, very similar to the aircraft accident investigators today. If that whets anybody's appetite, I guess I'll have to make a few copies of the whole thing, about 30 A4 pages.

To quote a well-known gardener, that's your blooming lot for this time. Until next time, happy steaming!

NSW Interclub Run — Bathurst

by David Proctor

In May, John Oliver and I travelled up from Canberra to the Bathurst Miniature Railway Society for the Saturday of the Interclub Run. It is the first time I have been to this club where the track is 550 metres of dual gauge 3½"/5" on ground level. The weather was perfect, the company was great and they have a nicely located track to run on. There were several visitors, mostly from the Newcastle-Sydney-Wollongong although the country areas like Mudgee and Orange were also represented. The club facilities are very good and it is to be hoped that the Bathurst folk will host more runs in the future.

The following selection of photos show some of the activity on the Saturday and I believe Sunday was just as good.

We'll start with two well-known 'gentlemen' from Wollongong — Ross Edmondson and Ian Kirby go for a blow around the track.

Some items caught in the yard at lunch time. The full size carriage in the background is the club and refreshment room.

Barry Potter drives one of the many locos which has emerged from his workshop, in this case I believe it was a Sandberg chassis

Brake vans belonging to Ron Boswell and Reg Watters — Ron's is the the one with the rather fierce looking character on the platform.

Neil Matherson of WDLS with his double headers, the front one of which is not all it seems (see last issue, page 60)

Part of the line up in the steaming bays at the end of the day

Cross Drilling Round Rods

Story and photos by Derek Falcon-Uff

Much has been written on the drilling of rods — an article appeared in *AME* issue 83 by Walter Shellshear. I have used this method in the past but have found the results to be sometimes disappointing. I think this might be due to the lack of rigidity in my drilling machine. I note that Walter centre popped his work before drilling while I used a centre drill. I also set my V blocks up with two steel bars (see **photo 1**). In this way two V blocks may be used and the hole drilled between them which avoids any damage to the V blocks.

Another interesting and accurate method is depicted in **photos 2 and 3**. A short piece of the rod to be cross drilled is placed in the lathe chuck and drilled axially. The rod to be cross drilled is placed in a vice that is equipped with parallel jaws and the short drilled rod is set over the rod at a right angle (**photo 2**). This then acts as a guide for the drill.

A few years ago I needed to drill a large number of wooden balls for a solitaire game. This I accomplished by clamping a wooden board to the drill table and drilling a hole a little smaller than the ball diameter, the ball was then placed on the hole and the required diameter hole drilled in the ball (see **photo 4**).

Over 45 years ago I made a V block which fits on an angle plate bolted to the lathe cross slide (**photos 5, 6 and 7**). This device has proved most useful over the years as it can be used to mill flats or key ways and to drill accurately spaced holes using the cross slide. The V block was produced by first fitting a plate to the top edge of a 2" x 1 1/2" x 1/2" piece of steel (see **photo 5**). The block was then secured to the angle plate using the 1/4" BSF screw which can be seen in **photo 5**, making sure that the top plate was pressed down on the top of the angle plate and that

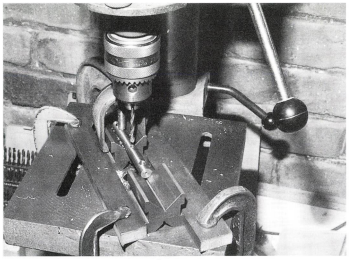


Photo 1

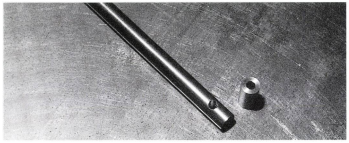


Photo 3

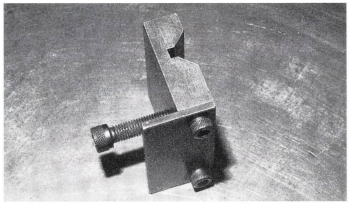


Photo 5

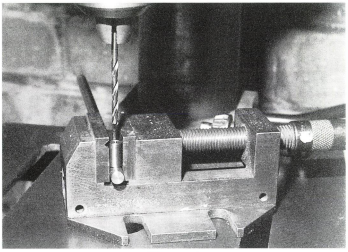


Photo 2

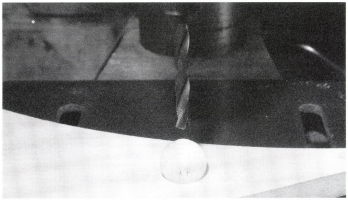


Photo 4

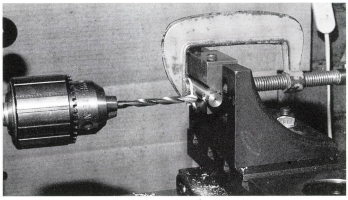


Photo 6

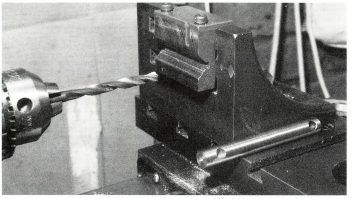


Photo 7

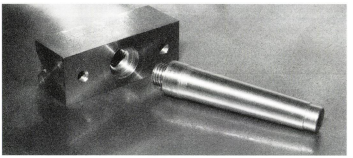


Photo 9

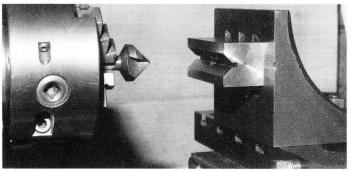


Photo 11

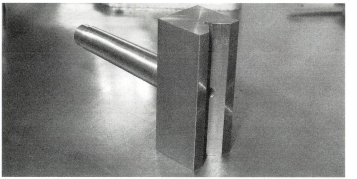


Photo 8

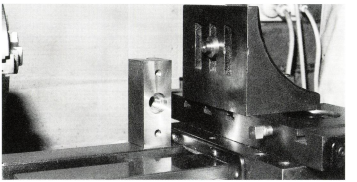


Photo 10

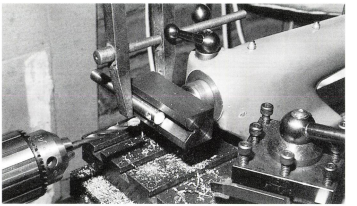


Photo 12

the angle plate was square with the cross slide. A 1/8" slot was then milled in the 1/2"steel block to a depth of 5/16". The V was milled using a counter sink bit. A useful depth of V can be obtained with a 1/2" bit, which is what I used initially. I have since trimmed the V up when it became damaged and for this I used a newly acquired 1" diameter counter sink. **Photo 6** shows a rod held in position with a G clamp and a hole drilled in the rod — a centre drill was used before the twist drill. Note the small piece of card board under the G clamp to prevent marking the work. **Photo 7** shows the drilled rod and the V block in position. My first lathe, a Myford ML7 needed the top slide removing before I could mount the angle plate and V block but I now have a Myford Super 7 which has a much longer cross slide which allows the angle plate to be fitted with the top slide in place.

My most recent device is shown in **photo 8**. It is a V block which mounts in the tail stock of the lathe, it is very fast to use and quite accurate. A Morse taper to fit your lathe is first required — this will have enough material on its end to machine a 1/2" BSF thread about 1/2" long and a parallel portion about 1/4" long and 5/4" diameter. The small end of the taper is tapped a suitable size for a draw bar. When the taper was complete it was fitted to the lathe head stock using the draw bar and the BSF thread screw cut. My plain part was about .72" diameter after trimming up. The steel block which was to form the V block was machined on four sides and marked out for the 1/2" BSF screw thread and the recess to receive the Morse taper and the two 1/4" BSF screws spaced to fit the angle plate. The centre pop mark was set to run true in the four-jaw chuck and drilled the tapping size for 1/2" BSF. The hole was then tapped and the recess opened out to fit the plain part on the Morse taper (see **photo 9**). A button was made to fit the recess in the block (see **photo 10**) and this was set to centre height with a centre mounted in the head stock, the 1/4" BSF screw in the back of the button was then tightened and the block was then mounted on the button and made parallel to the lathe bed with a dial gauge. The two 1/4" BSF screws were then tightened. A 1/8" end mill was found to be too short to cut the whole depth that was required so a 1/4" end mill was used to remove metal to a depth of about 5/16". My small end mill was then able to cut to a depth of 5/8". **Photo 11** shows the V machined and the 1" counter sink used to cut the V mounted in the chuck. I had intended to mill a 1/2" slot in the centre of the V block, but so far I have not needed it. I had also intended to machine away the metal at the back of the V block to remove the two screw holes but I decided that they might be useful in the future to trim the block if it becomes damaged. **Photo 12** shows the V block in use; a centre drill was used before the twist drill. The quill of the tail stock is able to rotate slightly so it is a good idea to hold the V block in the direction of the rotation of the drill — an engineer's clamp seems to be the best way to hold the rod for drilling. While writing this article it has occurred to me that the V block could be mounted on the outside of the tail stock quill, the steel block would be bored to fit the tail stock quill and a suitable clamping device incorporated. The V could be set up and cut in the same way as the Morse taper version.

The ILS Hot Pot Simmers Again

by David Proctor

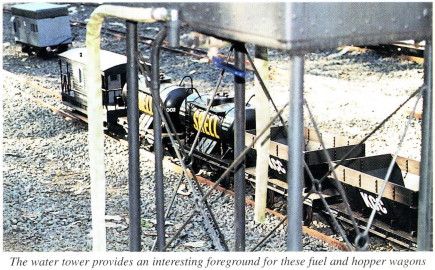
The principle activity for the weekend will be to run trains with as much rolling stock as can be mustered in a railway-like fashion. This statement, which appeared in the invitation to the Illawarra Live Steamers annual Hot Pot Run, is really the best description I can think of. As usual, it was a great weekend and (not quite so usual for Wollongong) the weather was perfect, though the rain came in on Sunday afternoon. This event has really become a showcase of what can be seen in 5" gauge and if it keeps growing at the present rate, could one day rival the annual convention in size. There were a handful of smaller gauge models as well and John Simon made sure that garden railways were also represented with his nice little Roundhouse steam loco and track. Rather than use any more words, as in the past, I will let the pictures tell the story.

Some of the detail Reg Watters achieved in his GWR coaches

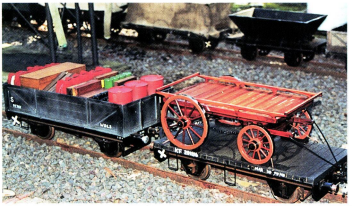
I did not get the name of the owner of this nice looking 44 class

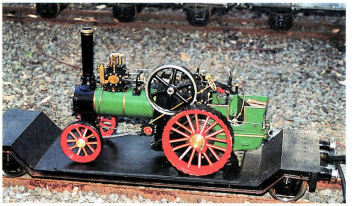
Where there is a Sandy River loco you will find Brian Carter, this time on Alan Douglas' model

Double-headed diesels to the AME 422 class recipe by Robert Woolley



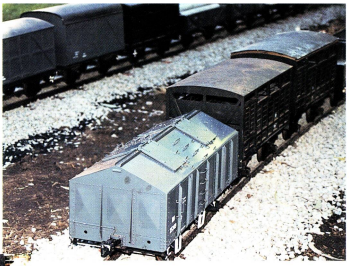
The water tower provides an interesting foreground for these fuel and hopper wagons





Some people place interesting loads on their freight stock, and out Fairfield way they seem to go just that bit further.

Ross Bishop's narrow gauge train is loaded with ILS ballast



A small sample of the many wagons in the yard

Barry Potter hauls one of the longer goods trains seen on the weekend

Concentration — Ray Lee enjoys a run on his 3506

Newcastle locos — Joe Huntley's 3633 and Jeff Wakeham's 3223

Eccentric Bushes to the Rescue

by Walter Shellshear

Drawings for publication by Peter Hall

The writer had occasion to advise on the possibility of modifying a set of locomotive coupling rods for a *Rob Roy* that were in peril of being consigned to the scrap heap. Somehow or other these rods proved to be either too long or too short to match the driving wheel centre distances. The errors varied from 0.010" to 0.030".

Having trained as a fitter and turner in the NSW Railways, the writer's thoughts first turned to the full sized solution of bumping up or hammering out when heated in the centre part of the rod to shorten or lengthen the rods, but whereas this would have been relatively easy in slightly lengthening a small rod, the problem here was that only one needed lengthening and three had to be shortened. So it was decided to fit eccentric bushes fixed with Loctite®. In the case of the three rods that had to be shortened, the eccentricity was such that the holes in the rods had to be enlarged slightly to ensure some metal on the thin side of the bushes.

The following notes, setting out the procedure for making eccentric bushes, are offered to assist anyone who might come up against a similar problem.

Figure 1 is a key diagram showing details of the eccentric bush required. Note that the eccentricity, E is the amount by which the rod must be shortened or lengthened. Remember that if the eccentricity is significant it may be necessary to increase the diameter of the hole in the rod to ensure some thickness of metal on the thin side of the bush, corresponding with D3 in Figure 1.

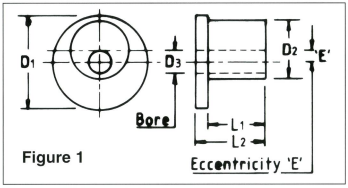


Figure 1

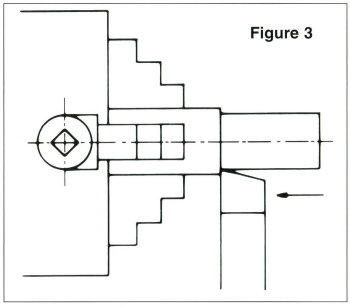


Figure 3

First, measure the centre distance of the holes in the offending rods, using a Vernier calliper as shown in **Figure 2** (in the case mentioned above, the rods had $^{5}/_{16}$" diameter reamed holes each end). The exact centre distance equals the Vernier reading minus $^{1}/_{2}$" (D4 plus D5). If both holes are the same diameter, D, then centre distance equals Vernier reading minus D.

Then measure the centre distance between the two axles that the rod spans, using the same technique. Don't assume the wheel centre distance on both sides would be the same — check right and left hand wheel centres independently. Turn the chassis over and measure across the axles as near to the axle boxes as you can get with the Vernier. The difference between this reading and the measured centre distance of the centre distance between the holes in the rod is the eccentricity (E in Figure 1) of the bush to be fitted in the rod. For a six coupled engine put the eccentric bushes in the outer end of each rod - for a four coupled engine, in either end of the coupling rod.

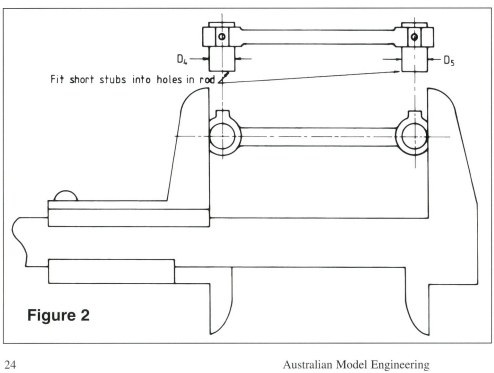


Figure 2

Now select a length of bronze rod of somewhat larger diameter than the flange diameter of the bush and set it up in the four jaw chuck to run reasonably true to eye. Face the end then take a light cut along the rod for a length of L2 plus, say $^{5}/_{8}$". This is a necessary starting point as cast bronze rods are not, as a rule, truly cylindrical. The operation is shown in **Figure 3**. The significance of this light cut will be apparent after studying Figures 5 and 6.

Now refer to **Figure 4** and proceed as follows:

1. Mount dial gauge in tool post of the lathe.

2. Slacken one chuck jaw, say, $^{1}/_{4}$ turn, and tighten opposite jaw, causing work to run out of centre.

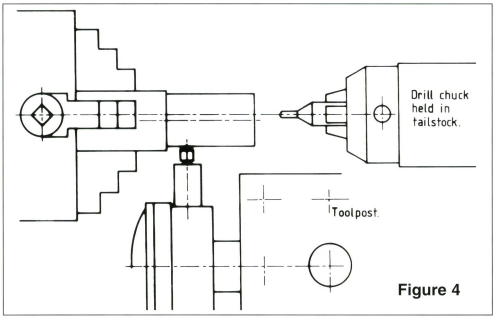


Figure 4

3. Bring dial gauge contact point up to touch the work and revolving chuck slowly by hand, ensure that the gauge knob is in contact during the complete revolution

4. Move top slide backwards or forwards until the lowest reading as the chuck is revolved is zero.

5. Read the maximum reading on the gauge as the chuck is revolved. This must then be adjusted by manipulation of the chuck jaws until the reading from zero (re-adjusted each time) is exactly twice the required eccentricity, E, of the bush.

6. At this setting centre drill the end of the work as shown in Figure 4.

7. Drill D3 minus $^1/_{64}$" for a length of L2 plus $^1/_4$".

8. Ream to crank pin diameter D3, as far as the reamer will go. Hold the reamer in the Jacobs chuck.

Now see **Figure 5.** As the diameter of the bush flange must be concentric with the bore of the bush, reduce the diameter of the end to D1 for a length of L2 plus about $^1/_{16}$", without altering the setting in the chuck. Make sure to retain at least $^1/_4$" of original rod

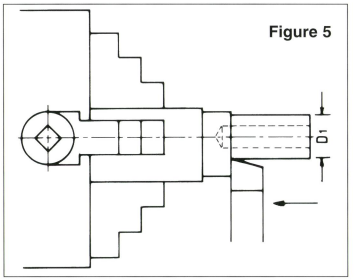


Figure 5

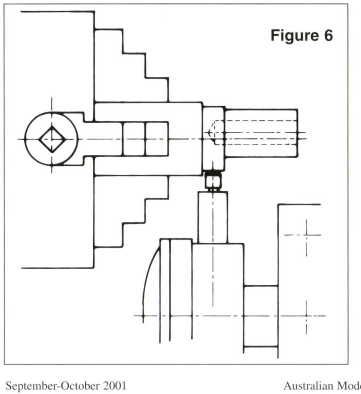


Figure 6

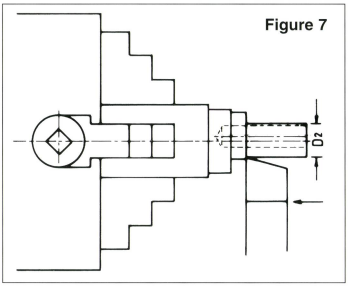


Figure 7

diameter as shown.

Next reset work to run true in chuck (**Figure 6**). Check with dial gauge as shown and adjust chuck jaws to give zero movement of the gauge needle when the chuck is revolved slowly by hand. The end section and hole will now run off centre.

At this setting reduce right hand end to diameter D2 for the required length L1 as shown in **Figure 7**. Check with the coupling rod, before taking out of the chuck, that this is an easy push fit in the hole in the rod. Part off at length L2 from right hand end.

Clean the bushes and the holes in the rod with solvent, and Loctite® the bushes into the ends of the rods, allowing 24 hours to set. After Loctite has set, push reamer through the bore again to ensure fully opened out to crank pin diameter.

General note: the bushes should not be thinner than, say, 0.025" at the thin edge. This may necessitate enlarging the hole in the connecting rod (D2).

This article is reproduced from the old CSMEE newsletter Canberra Branchline, *the forerunner to AME.*

Bracken Ridge Central's 6th Birthday

By Dave Harper

Sunday 24th June 2001 saw Bracken Ridge Central Lions Club celebrate the sixth anniversary of the opening of the Bracken Ridge Central Railway. Otherwise known as The Mackenzie Line, after Neil Mackenzie, who masterminded the building of the track, and still runs the show (so he thinks), the railway runs on the fourth Sunday of each month giving rides to the public to raise funds for the local Lions Club.

Neil kindly invited me along with the dual object of me writing this report and showing off my model *Red Fred*, the QR diesel railmotor. As the track is strictly steam only, Neil had arranged for an open gondola wagon to be available in one of the scale goods trains that are a feature of

Photo 1

Photo 4

Photo 2

Photo 3

Photo 5

running at the track. In this wagon *Red Fred* could be hauled around and shown off without compromising the steam only rule!

Modellers from as far afield as Bundaberg and the mid-north coast of NSW had also been invited, and this guaranteed a good turn-up of locos for what promised to be a busy day.

The first thing that I noticed on arriving at the track was the new shelter and ticket office at the station. **Photo 1** shows this impressive structure which was apparently financed by Brisbane City Council.

Mr Mick Scanlan, Queensland Rail, Group General Manager Passenger Services, appropriately opened proceedings, and also presented the awards. **Photo 2** shows Mr Scanlan (on the right) presenting the award for the best presented loco to Eddie Cooper from Bundaberg. Eddie's QR BB18¼ class loco is in the foreground.

Tom Walker from Central Coast Steam Model Co-op, NSW, won the award for the best presented QR loco with his very neat A10 in grey livery, seen in the foreground of **photo 3**. Behind it is Neil Mackenzie's A12.

Photo 4 shows one of the long scale QR goods trains on the track, providing a good load for Peter Beck's A10!

There were three QR BB18¼ locos running on the day, and I managed to capture two of them in adjacent sidings in **photo 5.** Jim Hurst from Bribie Island is stoking up his engine at rear, in front is

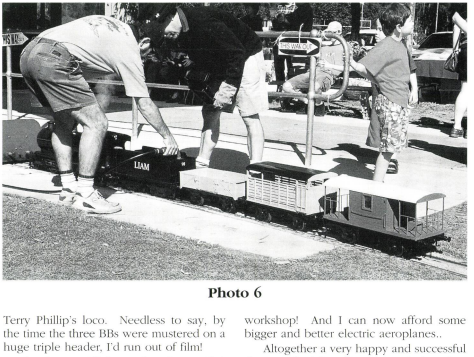


Photo 6

Terry Phillip's loco. Needless to say, by the time the three BBs were mustered on a huge triple header, I'd run out of film!

Another neat little goods train was that drawn by Paul Kilminster (QSMEE) behind his ROD loco. (**photo 6**) The rolling stock look very much like English prototypes, even though the ROD locos were also used in Australia, I believe.

As a footnote, I can add that I put a For Sale sign on *Red Fred* as he toured around, and he's now retired to the Sunshine Coast to run on Alan Houston's home track. Much better than gathering dust in my workshop! And I can now afford some bigger and better electric aeroplanes..

Altogether a very happy and successful day was had by all, on a typical perfect Brisbane winter day, and the local Lions club profited handsomely. Well done to all concerned!

Did you know . . .
Light travels faster than sound?

That is why some people seem bright until you hear them speak!

Eccentric Turning

by Peter Dawes

Setting up an eccentric to machine the required throw is always a tedious chore. We usually use the independent four-jaw chuck for the job because calculating the required packing thickness using a self centring three jaw chuck is too difficult. But use of a self-centring chuck has obvious advantages.

While indexing *Model Engineer* I came across a formula used by Tubal Cain (TC). The reference is in the program. I have never seen a formula elsewhere. He doesn't quote any source and I haven't tried to verify it. In any case if there had been criticism or corrections, I would have seen those. It smacks of a bit of empiricism with those nice round fractions $^1/_2$ and $^5/_8$, and that might be why Tubal Cain says that the formula is not appropriate for very large offsets relative to diameter.

As will be obvious, it is not that quick and easy to calculate even then, so I have written a Basic program which does it in a fraction of a second. The program is called OFFSET.BAS and has been compiled in Quickbasic to produce OFFSET.EXE. The former must run in the Basic "interpreter" while the latter has the advantage that it runs directly from a DOS prompt in the directory that contains the program. But unfortunately, the EXE file is not printable and can only be distributed on disc. Users can type in the BAS version and compile it to and EXE file themselves but only with Quickbasic, not Qbasic.

I have deliberately kept the program down to basics to save space and simplify the typing in. Users can even delete the lines up to "Start:" but they run the risk of forgetting what it was about, years down the track. So I don't recommend leaving these notes out.

As an example of the calculation, a 1.000" diameter eccentric with a throw of 0.25" requires a packing piece thickness of 0.3259277". Users have to round it themselves. The stroke would be twice the eccentricity. He (TC) suggests filing up the piece from suitable stock, miking it to size. But here would be the ideal place to use Jo blocks if we had them.

Blowfly has eccentrics $1^9/_{16}$" (1.5625) OD with an offset of $^9/_{32}$" (.28125). The thickness of the packing piece required for them is .383". Start with a piece of 10mm stock and thin it down by 10-11 thou. You only have to make it once. Label it and store for future use. (But note that the pump eccentric is $1^{11}/_{16}$ over the flanged edges. Its packing piece is 0.386").

Another tip: Remember to scribe a line lightly across the face of the disc before taking ot out of the lathe. The line must be at centre height and start exactly opposite the jaw with the packing piece. Later when setting the timing, this will prove invaluable, showing true top and bottom dead centres. Those are quite difficult to find after the piece is taken out of the chuck.

DOS and BASIC

As an aside, I strongly recommend that model engineers keep an old computer running Qbasic or Quickbasic under DOS 6.xx because no other language has so many quick and easy programs written in it as does MS Basic in one other of its forms. Model engineers always use it, as do contributors to *Sky and Telescope*. There are good reasons why it is universal, simple, high level, compilable and very maths and "text-capable".

I keep a directory called **Engineer** just for these programs. It contains more than forty, covering maths, astronomy and engineering — and they are all very practical. For example there is one for calculating the heating area of a boiler given the number of tubes, their diameters and lengths, the areas of the tube plates and the linear dimensions of the firebox. The user has to first estimate the areas of the rear tube plate and backhead plate, but once he has those the calculation takes less than a second.

Now while Windows 95 has the option of a dual boot to DOS the next version Windows 2000 will drop DOS completely and after that again it will be some version of NT, which has already dropped DOS. There is no way we would be able to write a program as compact and simple as this to run in Windows and to publish it like this. Windows programs are so big they can only be distributed on floppy discs or even CD's.

It's true that compiled (EXE or COM) programs cannot be printed. They must be distributed on disc. But that doesn't stop us printing a program in source code form (i.e. Basic).

So when you upgrade to that new whizz-bang computer running at 500mHz with gigabytes of memory to run the latest enormous Windows programs, just make sure you hang on to your little old obsolete DOS machine with Qbasic.

Postscript

The derivation of the formula for the thickness of the packing piece required to make an eccentric in a self centring chuck might seem academic. But I will be surprised if it doesn't generate as much interest as the ball valve problem.

Incidentally, on that subject I came across a reference in *ME*, #3863, p808, saying that the lift for safety valves should be $^1/_{20}$ to $^1/_{25}$ of ball diameter. The two authors mentioned were Tubal Cain (TC) and Prof. Hall and both would have to be impeccable authorities. Clearly, safety valve design doesn't try to maximise the area of the passage past the ball.

After Alan Wallace's scholarly work on the flow around ball valves (AME issue 86), perhaps he will rise to the challenge with this problem.

I have been playing with the TC eccentric formula and gave it to a couple of mathematicians. Neither managed to derive a correct formula or confirm the original one. This may have been due to misinterpreting the way a self-centring chuck works. Non-engineers apparently do not think to allow for the fact that as the jaws open to accommodate the larger diameter of the workpiece plus packing piece, the whole workpiece slips deeper between the two opposite jaws. This occurs because its outline is no longer a true circle.

So I have tried to resolve the problem graphically on paper in as large a scale as I could manage. That yielded two interesting results. First it confirmed TC's formula as being accurate up to ratios of E/D equal to 1/3 or larger — at least to the accuracy of my drawings.

But the second finding is even more significant. Above about E/D=1/5 the workpiece slides so far in between the opposing jaws that it cannot be held safely. So the method should NOT be considered for E/D ratios of more than about 1/5.

LaMarche

Another related factor came to light because of an article on this same subject by R.E. LaMarche writing almost ten years earlier in *Live Steam*, namely December 1981. I only found this one very recently. It was in my *Live Steam* index but I overlooked it.

Mr LaMarche worked it out on a different principle to that used by TC. He calculates the packing piece thickness based on a table "look-up", which he doesn't derive in the article. It involves a couple of simple calculations then looking up the two dimensional table to find a "correction factor" (CF). The CF is put into another simple formula to finally give the packing thickness. But the method also requires tedious manual interpolation for intermediate values on both axes of the table. This makes it so inconvenient that unless it is computerised, users would be better off using the four jaw chuck method.

Why computerise it? Well, the computer is just another tool for MEs to use even if it doesn't cut metal, and it does this kind of job accurately and extremely quickly. While tables are nowhere near as convenient for computerising as a formula, I have now written a Basic program that performs the LaMarche calculations. Typing in the 600 decimal numbers for the

table was the hard part. It took two hours of mind-numbing work with my wife reading out the figures while I typed and checked, but at least the calculations can now be performed to all intents and purposes instantaneously. The data that make up the table has to be stored in the form of a separate ASCII file of 100 lines (representing 100 rows), with comma delimiters in each line for the items in the 6 columns. That file is loaded into a 100 x 6 two dimensional array at the start of computations. Specifying the "index" numbers of the two axes of the array serves to identify any one of its 600 cell's contents.

To have put all the interpolations into the array itself or into the data file would make them far too big. The loading process is invisible to the user and only takes a second so that it is no bother. The program performs any necessary interpolations for the user's problem at run-time but the source code for the interpolations is still tricky and cumbersome, making the whole program too long for publication in a magazine.

Correction for jaw width

What makes Mr LaMarche's method especially noteworthy is that it includes a correction for the width of the faces of the chuck jaws! I experimented with a five inch (125mm) diameter disc with a one inch thick (25mm) packing piece (giving an E/D ratio of 1/5). This required the large-diameter chuck jaw-set (i.e. the reverse set) and on my 150mm (6") chuck these jaws have faces about $^9/_{16}$" wide (15mm). It was immediately obvious that wide jaw faces must make a difference because opposite the packing piece the two jaws hold the work by just an edge. In other words the point at which they contact the work is offset from a 120 degree angle by half the width of the jaw face. That error must vary with the diameter of the workpiece so it cannot be treated as a constant. At least this has the effect of putting the gripping points somewhat closer together so that larger E/D ratios can be accommodated than would otherwise be the case.

What is important is that TC's formula contains no explicit correction for it. He probably assumes narrow-faced jaws on small diameter work — valid for most eccentrics.

Therefore I have to advise MEs to use the independent four jaw chuck for eccentrics when the job requires the use of the "large-diameter" jaws (i.e. the set with the steps on the inside, or wherever the jaw face is relatively wide). Either that or they might like to try Mr LaMarche's method. I certainly wouldn't try it if I had to calculate it by hand, but one or other of the two methods calculated on the computer is very well worth using just to be able to work with the self-centring chuck.

At this stage the only comment I can make about the accuracy of his method is that it gave a fairly accurate estimate of the offset with the 5" disc example that I mentioned above. TC's formula was also quite close, but not as good if my graphical solution is correct. Somewhat surprisingly for two such a complex formulae, with the values for the *Bloufly* eccentrics of E= 0.28125, disc diameter= 1.5625 and with a jaw width of 0 inches, there was absolute agreement between LaMarche and TC.

It is as if TC derived a very close formula but did not get as far as including a correction for the jaw width.

Another tip on machining eccentrics

Another tip that some colleagues offered is not to try to hold and machine the eccentric directly but make an offset stub arbor to hold them. For *Bloufly* eccentrics you would probably start with a short piece of 2" diameter BMS. The packing piece is then calculated for the same offset but for 2" OD rather than $1^9/_{16}$". A short offset arbor is machined on the block so that the pair of eccentrics can be mounted side by side and bolted up tight with a capscrew and thick washer at the end. There could also be a keyway in the stub, or a locating stud in the face of the shoulder if required. The great advantage of this idea is that the diameters and shoulders can be turned identically, and in a single operation. Also, it becomes very easy to make multiple copies.

```
CLS
PRINT "          OFFSET.BAS (15/8/1999)"
PRINT " A program to calculate thickness of packing"
PRINT " strip to place under one jaw of a three jaw"
PRINT " s/c chuck on an eccentric of specified"
PRINT " diameter to produce a specified stroke."
PRINT "    The stroke is twice the eccentricity."
PRINT "    The formula is one given by Tubal Cain,"
PRINT " page 577, 3rd Nov, 1989, Vol 163, No 3860,"
PRINT " & is used as quoted without embellishments"
PRINT " to save space. So there is no rounding."
PRINT "    Units can be metric or imperial"
PRINT " as long as they are the same throughout."
PRINT " Users should see T.C.'s original drawing."
PRINT " Formula:-  (^ means raise to power...)"
PRINT "    T=1.5E(1-1/2(E/D)-3/8(E/D)^3))  where:"
PRINT " packing thickness=T,eccentricity=E,"
PRINT " eccentric OD=D; (stroke=2*E)."
Start:
INPUT "  Enter eccentricity required (E)..... "; E
INPUT "  Enter diameter of eccentric (D)..... "; D
      R = E / D
      T = 1.5 * E * (1 - R / 2 - 3 / 8 * (R ^ 3))
PRINT
PRINT "Thickness of packing required (T) = "; T
INPUT "  Want to do another calculation? Y/N"; Q$
IF Q$ = "Y" OR Q$ = "y" THEN GOTO Start
END '————-of program OFFSET.BAS ————————
```

Availability of programs

The seven files, i.e. TC's called "Offset", LaMarche's called "Offset2", in both Bas and Com (and/or EXE) versions, plus "Tabledat", the present text article, and the previous one which are in ASCII, are available on floppy disc from the AME office for $5 posted.

13th Australian Miniature Traction Engine & Steam Road Vehicle Rally

Mannum, SA — 13 to 14 October, 2001

This year, the rally is being held in South Australia at Mannum, on the Murray, 100k east of Adelaide. ***See last issue for more details.*** The Football Club have a **bottomless coffee pot** and will cater the Saturday evening meal. There will be a **Main Street Parade** from the showgrounds to the town centre and return from 11 am on Saturday. As the showgrounds and the street parade are 'public places' all self propelled machines must hold a Transport SA exemption permit to run and these will be obtained through registration for the Rally. Late registrations with no permit will only be able to operate as static exhibits — so the idea is —

Register now — permits not in by 7th September — you won't be in the parade!

Forms for Rally entry, registration, meals, etc. now available from Rally Organiser, John Levers (08) 8569 2842

A 7¼" Straddle Type Passenger Car

by Stan Kirk

Drawings from the author's originals by Jim Gray (except by the author where indicated)

This is a straddle passenger car that requires very little maintenance and is safe to use. The type of unit we have designed has a proven track record, as our first two cars have now travelled well over 25,000 km during the past several years. You may be wondering how this can be, but the track is situated in a tourist theme park on the Far North Coast of NSW and operates seven days a week.

This carriage is not a prototype and has been primarily designed to carry passengers in comfort and most importantly, in complete safety. The cars are approved to carry 6 adults or 9 children. Please note that not all the drawings are specifically referred to in the text as they are self-explanatory. The version described in the text has pneumatic brakes but the drawings are included to shown the minor changes required for vacuum brakes also.

We tend to contract out all our club requirements but, for those of you who are desirous of building your own equipment, the following is a brief description. You will need access to heavy cutting and

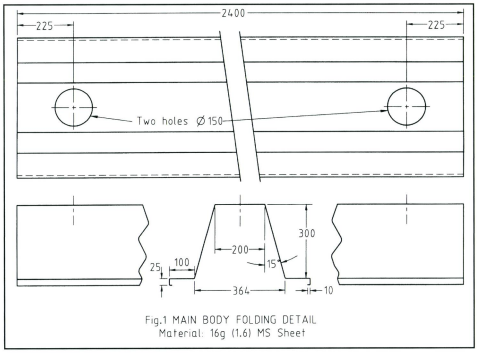


Fig.1 MAIN BODY FOLDING DETAIL
Material: 16g (1.6) MS Sheet

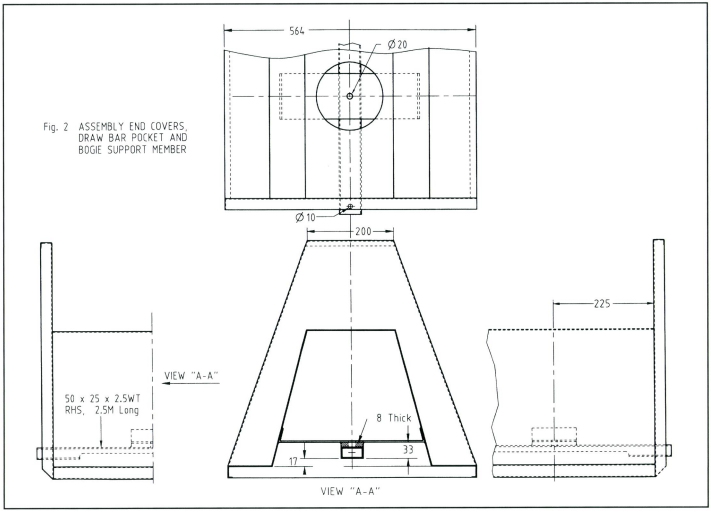


Fig. 2 ASSEMBLY END COVERS, DRAW BAR POCKET AND BOGIE SUPPORT MEMBER

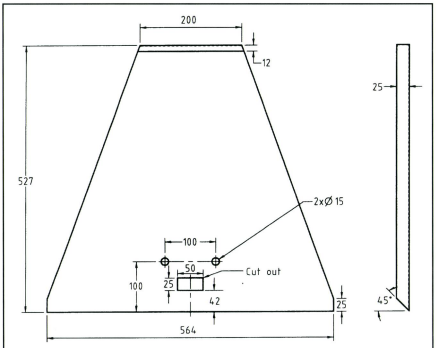


Fig. 3 END COVERS 2 - off reqd
Material: 16g (1.6) M.S.

folding equipment to make the main body of the carriage.

The method we suggest to make the car body is to fold the main body section first (**Figure 1**). Fold the end plates and cut rectangular holes as shown (**Figure 3**). Drill holes in end plates. Now make up draw bar pocket and bogie support complete (**Figure 4**). To assemble for welding, have the main body turned upside down, sitting on blocks of a suitable height to clear the end plates.

Place the draw bar assembly within the main body, then slide the end covers into position. Align all components square and parallel before welding. Keep all welds to the inside where possible so as to ensure a neat finish. Make sure there are no sharp edges, particularly on the outside.

The tread plates are of light weight aluminium pattern, cut to 150mm wide by 2390mm long. Fold one edge up at 50mm wide by 15 degrees. Secure to body with 4 only hex head screws, M6 x 15 long, spaced in the centre along the 100mm wide surface. Remove tread plate for painting. Do not delay in getting the paint work done before surface rust appears. Incidentally, we prefer to powder coat all our work as it is cheaper and very durable.

A seat can be made at anytime. For the base of the seat purchase a piece of pine 20mm thick by 190mm wide and 2380mm long. From another piece of 20mm thick pine, cut two circles 140mm diameter and secure to base, so as to match the holes in the main body. Foam for the seat is 100mm thick, glue to base and cover with suitable vinyl. The completed seat does not need securing to the main body. It is better not to secure it for ease of removal for storage in case of inclement weather, or for quick access to the bogies in case of derailment.

When the main body had been painted, secure the four ball

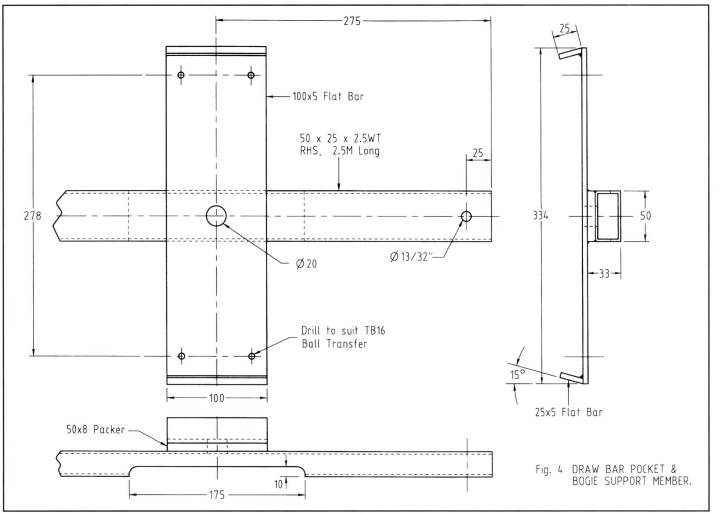


Fig. 4 DRAW BAR POCKET & BOGIE SUPPORT MEMBER.

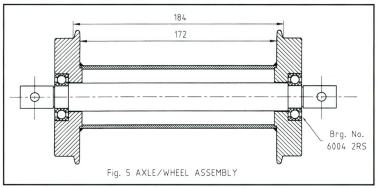


Fig. 5 AXLE/WHEEL ASSEMBLY

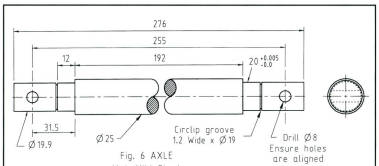
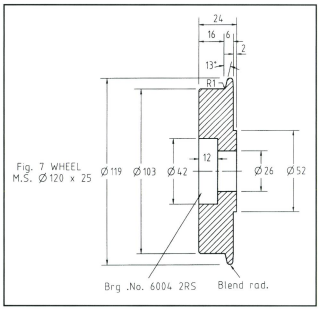


Fig. 6 AXLE
Mat. Mild Steel



transfers (Anthony Bearings TB16) with M5 screws. We have not described couplings, as each club have their own type.

The bogies

Let us now look to the manufacture of the **bogies**. Start by having the side frames (**Figure 13**) profiled from 20mm plate. Scuff grind or machine the thickness to 19mm. Finish off all other machining, keeping them as a pair. The bolster (**Figure 9**) can be prepared. Cut the 75 x 25 RHS to 306mm long. Mark out and machine two 35mm diameter holes as well as the 68mm diameter centre hole, which are all on one side. Drill all other holes, as well as the plug holes, for welding of the end pieces. Generally, four 12mm diameter holes each side of each end is sufficient.

Using 50mm by 20mm flat bar cut to 70mm long, bore out 35mm diameter holes in each piece and allow one side of each piece to protrude out of the RHS for machining. It is easier to drill the tapping size holes at this stage. Using a lining up plug 35mm diameter, plug weld into place and dress off to clean up. Tap M6 holes and machine to length. Now weld the centre guide post into position.

We now need the axles machined as they will be used to maintain width between frames. Have the side

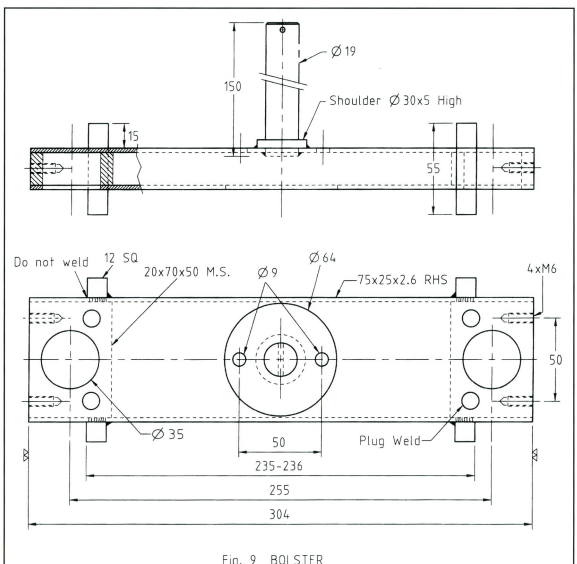


Fig. 9 BOLSTER

frames standing upright on a flat bed, place the axles into position with temporary 5/16" diameter rods. With the end plates (**Figure 15**) bolted to the RHS section, place into the frames and clamp to upper half, equalising the RHS within the frames. Having fabricated the wedge (**Figure 10**) this can now be fitted by machining the faces so that when this item is bolted into place, there is a clearance of say 0.02mm. Cut the 12mm square inner guides to length and clamp in place. Make sure all is true and square. They should now be welded to the RHS. The bolster is now complete.

Machine the wheels (**Figure 7**) to finish sizes with exception of the tread face and flanges, which you should leave in the rough state. Finish spacer (**Figure 8**) and clamp together with the wheels. Weld all this assembly together. It is wise to make yourself a template of the wheel profile for finish turning of the tread and flanges. Before you assemble axles to the completed wheel housing, open out the 8mm holes to 8.3mm diameter. Bearings for this assembly are 60042RS.

We need to check that there is sufficient movement in the completed assembly. Still using the temporary 5/16" rods at this stage, re-assemble the bogie with the springs in position and place on a flat surface, lift one wheel at a time by about 10mm. All other wheels should remain static. To ensure that this will occur, some fitting may have to be

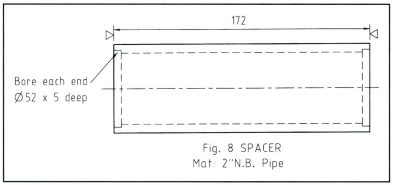


Fig. 8 SPACER
Mat: 2"N.B. Pipe

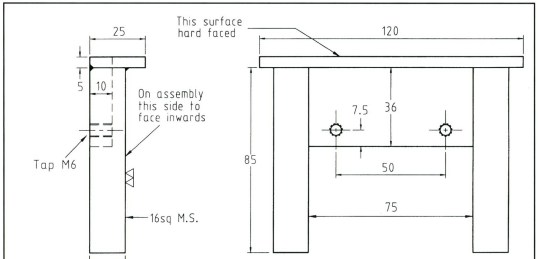


Fig. 10 WEDGE
2-off per bogie

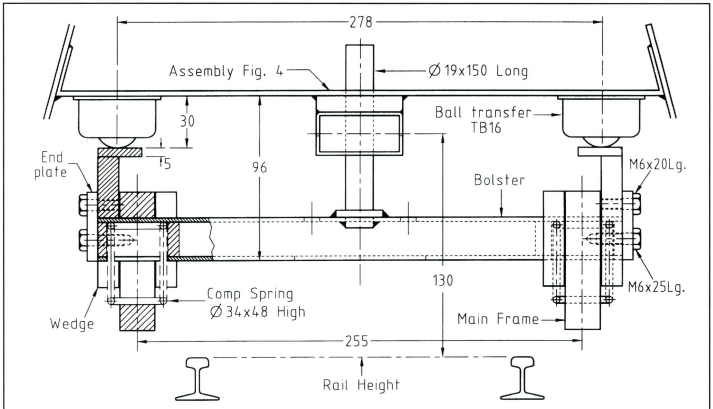


Fig. 11 SECTIONAL END VIEW SHOWING BOLSTER

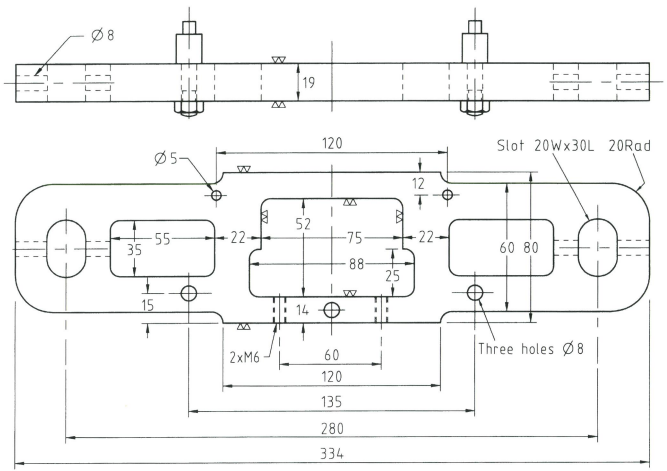


Fig. 13 SIDE FRAME

Note Unless designated all radii are 5mm

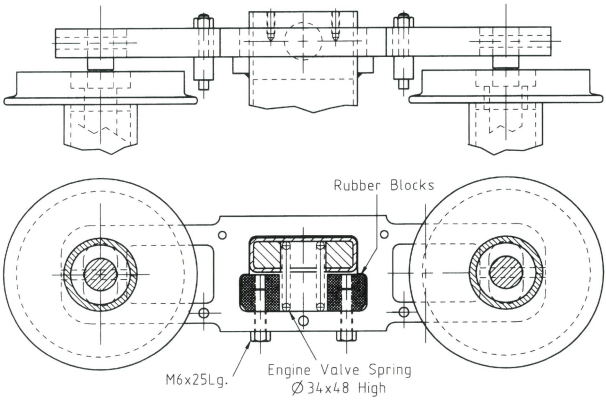
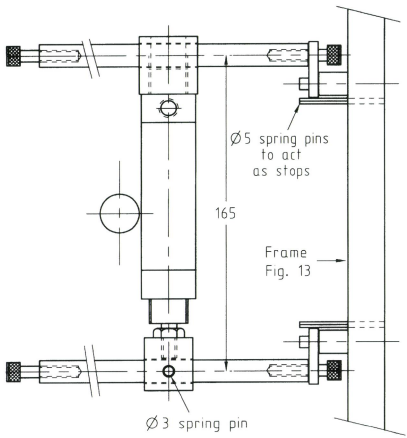


Fig 14



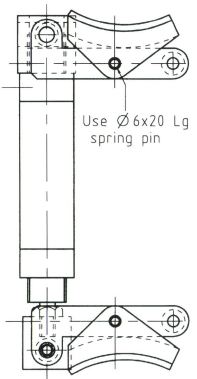


Fig. 12 BRAKING SYSTEM LAYOUT
Using S.M.C. single acting spring return cylinder
CM2 Series CM2B20-205.

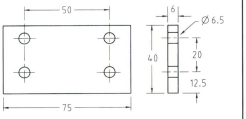
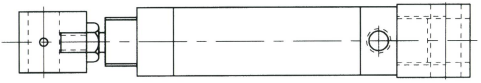
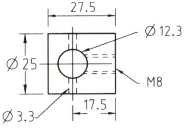
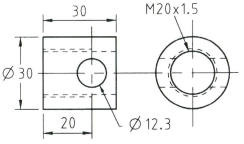


Fig. 15 BOLSTER END PLATE
2-off per bogie





Item G — 1 off



Item H — 1 off

S.M.C. PNEUMATICS CM2 Series
Part No. CM2B20-205

Fig. 16 (Assembly shown in fig.12)

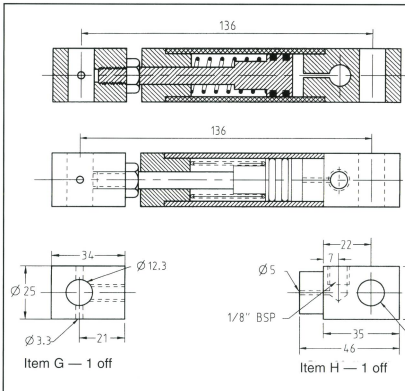


Fig. 17 (Assembly shown in fig.12)

done around the guide area of the bolster. When this has been done to satisfaction, take apart and paint. The bogie is now ready for final assembly.

Once the bogie has been re-assembled and you are satisfied, remove the temporary $^{5}/_{16}$" diameter rods and replace them with 8mm diameter spring pins (roll pins). Remember to face the split downwards. The final part to install is the rubber blocks which assist the spring when the car is fully laden. Whilst the car is running empty, one spring supports the weight and allows freedom of movement in the bogie and lessens the change of any derailment.

When the car is loaded with passengers, the extra weight is compensated for by the rubber pads which I can assure you give a very comfortable ride. If unable to obtain solid rubber to make the blocks, then purchase rubber door stops Code No YDSB25P and modify by cutting and

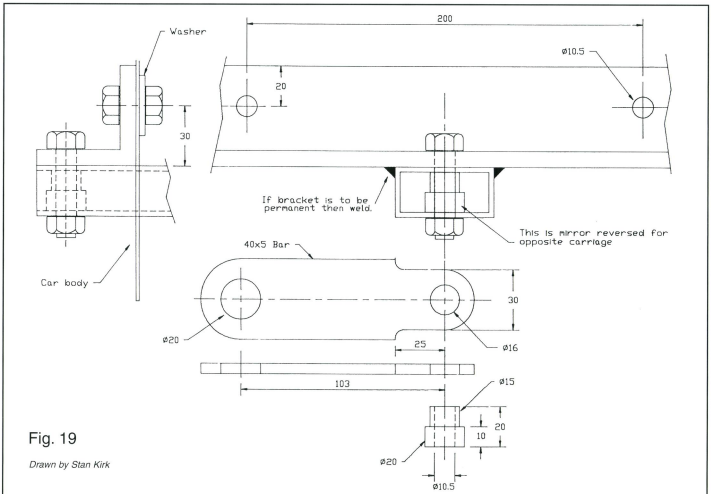
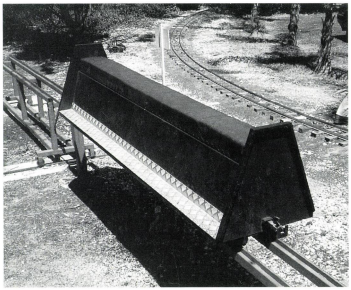


Fig. 19

Drawn by Stan Kirk



A completed car constructed as per this article

grinding. There is already a centre hole which accepts an M6 screw. Be sure you have at least 5mm clearance between top of rubber and bolster.

You would have drilled extra holes in the frames and bolster as per the drawings and these are for the braking system. We use a pneumatic system, mainly because there are less moving parts. The air cylinders are a commercial item, although you can make your own cylinders, and finally, they are virtually maintenance free.

The bogies are designed to have either vacuum or pneumatic systems and drawings are available. Installation of the braking system can be done at the same time as you assemble the bogie or at a later stage.

On this occasion, we have shown the pneumatic system (**Figure 12**) and relevant parts (**Figures 16 and 18**) and the vacuum systemvariations in **figures 17 and 18**. By removing the M6 screws at the ends of shaft (**Figure 18 item A**) will allow the installation or removal of the system.

Articulation

If you would like the cars to be articulated instead, it is fairly simple following **Figures 19 and 20**. Use the already described bogie manufacture, which can have the advantage of a quick changeover from articulated to standard cars. Just remove the fabricated frame. Should the units be turned into permanent articulated cars, we suggest some welding of the fabrication to the main body. For the record, our club sees no advantage in having cars articulated other than saving on the cost of one bogie. However, everyone to their own choice — that's what the hobby is all about.

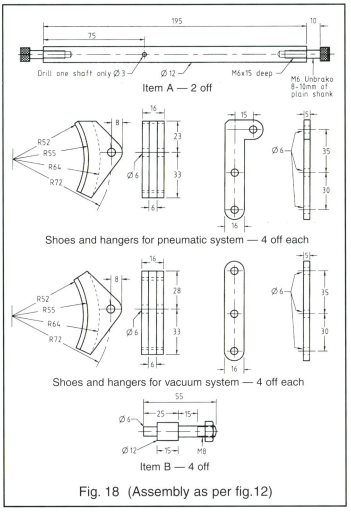
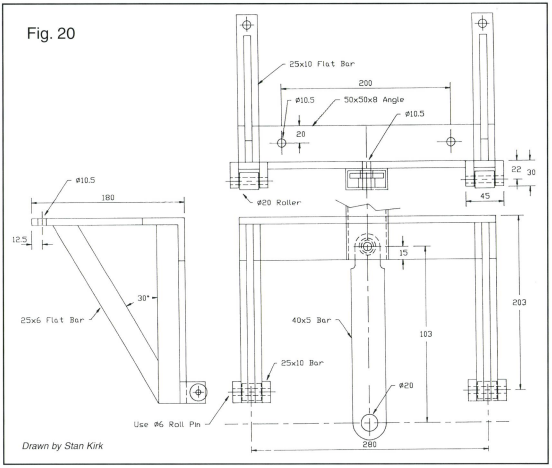
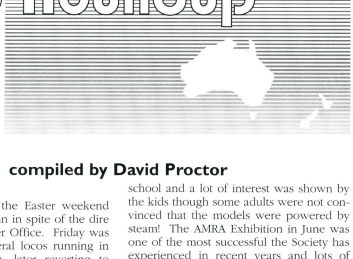


Fig. 18 (Assembly as per fig.12)



Club Roundup



compiled by David Proctor

Auckland NZ

The weather for the Easter weekend was splendidly autumn in spite of the dire threats by the Weather Office. Friday was a club day with several locos running in the reverse direction, later reverting to normal running as the public began arriving. A total of 15 engines (8 of them being visitors) ran over the weekend and Jonathon Ordish of Manukau LS brought his expertise to the ticket office. Saturday running was followed by a BBQ and Sunday dinner was a spit roast, followed by prize presentations.

In the Exhibition Room there were various items on display from 19 members, including traction engines, stationary engines and boilers, field guns and aero engines. A pictorial display in ink and wash depicted the progress of steam generation from the earliest days and a wall clock by Roger Van Wyn was made entirely of wood (and glue). Several locomotives were on display, notably Alan Gasteen's beautifully finished rebuilt *Royal Scot*.

Auckland Society of Model Engineers
Location: *Petersen Road Reserve, Waipuna Road, Panmure*
Public Running: *Every Sunday*
www.asme.org.nz

Balcatta WA

Some NDMES members, along with members of other clubs in WA recently attended the official opening of the new engine shed and museum at Katanning Miniature Railway, 3½ hours' drive south east of Perth. No engines were taken as the KMR is 7¼" gauge only, although Doug Baker did suggest making an adaptor truck for the *Tich*. There were four engines from Castledare and two from Bunbury.

Bob Brown has been appointed as an AMBSC Boiler Inspector (copper only at his request). Dad's army are plugging away at the Club House steelwork and the next stage of construction will be the block walls, to increase the rigidity of the whole structure before the roof goes on..

The May run day set a record on gate takings and on the variety of locos running, including a new *Butch* by Clive Chapman. The club mounted a working steam display at the Mirrabooka High school and a lot of interest was shown by the kids though some adults were not convinced that the models were powered by steam! The AMRA Exhibition in June was one of the most successful the Society has experienced in recent years and lots of rides were given and the active displays drew a lot of attention.

An electric violin is something totally different. David Naeser decided to build one for his daughter and unlike the acoustic violin which derives its sound through the strings vibrating on the bridge on the upper plate of the sound board, in the electric violin the bridge is replaced with a piezo-electric vibration transducer which puts out a voltage signal which varies with the vibrations. The appearance of the violin is more of a skeleton of the familiar shape as there is no longer a need for the sound board.

Northern Districts Model Eng. Society
Location: *Vasto Place, Balcatta*
Public Running: *Last Sunday*
http://www4.tpg.com.au/users/jimclark

Bulla Vic

A grant has been received for further work on the wetlands. The site looks terrific since the recent rain with the two ponds full and the vegetation now growing rapidly. The tree planting day was a success and another 50 plants will be acquired planting later on. The fenced off area adjacent to the station is almost complete. Another grant has been received towards the building of the station and the club has to contribute a similar amount.

Tullamarine Live Steam Society
Location: *15 Green Street, Bulla*
Public Running: *1st & 3rd Sundays*
http://www.netlink.com.au/~rbritt/bullahill.html

Burnaby, BC Canada

For the first time in many years the BCSME premises have been broken into. The thieves entered the machine shop and removed a number of small power tools and several contents of a member's toolbox. The weed eater, chain saw and builders level were taken from the tool shed, but on the "brighter" side, damage was minimal, a sign that the intruders were discriminating thieves and not vandals.

The covered tables in the picnic area have been a big hit and can account for some of the increase in birthday party groups attending so early in the season.

British Columbia Soc. of Model Engineers
Location: *Rainbow Creek Station, 120 Nth Willingdon Ave, Burnaby, BC.*
Public Running: *Saturday, Sunday & public holidays, Easter to Thanksgiving*

Canberra ACT

The members of the CSMEE are being forced to relocate to a new site which will most likely be outside the ACT. The ongoing lack of interest shown by the ACT government in providing any security of tenure or an alternative site and the false promises, coupled with straight out lies by the local politicians have pushed the club to the limit of tolerance. The moral of the story is "never stand between a politician and the opportunity to make a big increase in revenue". A local body just over the border has shown a high level of interest in having the track relocated to their town with the offer of considerable assistance to become operational. This will be an ongoing story. In the meantime the club is enjoying a high level of support from the Canberra community and there are always plenty of passengers on hand. Preparations are well under way for the annual invitation run in September, which as usual will be held during Floriade.

Canberra Society of Model & Experimental Engineers
Location: *Geijera Place, Kingston*
Public Running: *Last Sunday*

Casino N.S.W.

The local town 's beef week festival at the end of May was a huge success. Over the four days of operations our club members worked hard keeping trains up to the demand of the traveling public with six locomotives and one ¼ size traction engine. Our annual general meeting is the next major event on our calendar on the 4th August. Visitors are always welcome at our track and we operate every Sunday at 10am to 4pm, picnic & B.B.Q. facilities are available. All interested readers are invited to view our web site .

Pacific Coast Railway society Inc.
Location: *Cnr Queensland Road and West St Casino*
Public Running: *every Sunday.*
http://www.casinominirail.com/

Cobden Vic

The dust had hardly settled from the AALS Convention when it was all hands on deck again for the Corangamite Shire's Federation celebrations. Advertising was widespread through all media resulting in lots of passengers, and of again Rotary had their amusement and food outlets all in place. The Saturday night was topped off by a large turnout around 9:00pm for a fireworks display. Sunday started out so cold that some of the signals had frozen up solid, but the bright sunny day soon

put things right. Again the passenger numbers were good and at 11 o'clock Dairy Park, a great historical preservation project was officially opened adjacent to the railway.

Several members made the trip north to Echuca for the annual Queens birthday weekend festivities, with a few other visits on the way.

South Western Model Engineers Inc
Location: *Grayland St, Cobden*
Public Running: *3rd Sunday*
www.gatewaybbs.com.au

Eddington Vic

The main 480 metre circuit of the 5" ground level track has been completed except for the short link that bypasses the inner loop.

The Mayor of Loddon Shire, Mr. John Brook, officially opened the new track on Saturday 26th May 2001. This was a very successful day with over 100 people present and 12 locomotives in operation. The club has received several visitors from other clubs and they have all been impressed with the new track.

We will be extending an invitation to other clubs to attend an "all comers" day - probably in May/June 2002 when other facilities such as the steaming up bay and station have been upgraded. We will advise when this date has been set. In the meantime visitors are welcome to visit the club but are advised to contact the club secretary Mr. Rob Gould at P.O. Box 229 Golden Square 3555 or phone (03) 5443 8487.

Loddon Miniature Steam Locomotive Society Inc.
Location: *McColl Street, Eddington*
Public Running: *4th Sunday*

Eltham Vic

Considerable work has been carried out at Meadmore Junctn and re-signalling project is progressing, with new conduits, cable pits and bases for the signal gantry installed. A new diagram has been issued for this junction. Contract work has started on the fencing at Diamond Vly station and quotes are being obtained for additions to the BM Coleman bridge, concreting in front of DV station and asphalting level crossings. A quote has been obtained to straighten *Joyce's* tanks and a full repaint

The big event ahead for the DVR is the 40th Birthday celebrations which will be held on the last weekend of October.

Diamond Valley Railway Inc
Location:*Eltham Lower Park, Main Road, Eltham*
Public Running: *Every Sun & pub holiday*
http://www.railpage.org.au/dvr

Evandale Tas

On June 16th ELRSS held a club day for members. There was no work done, just a fun day for all, although it did provide a chance to experience a larger number of locos than usually runs on our track. There were eleven locos running during the day, six 7¼" locos and five 5" locos were put through their paces, all running at some stages on the main ground level track. Peter Lawson's new 5" Rail Motor was tried by all and judged to be a "real beauty".

7¼" locos included two 0-6-0 diesel V's, 2 Heidi steamers, a battery rail motor and a petrol Romeo. 5" locos included two Victorian B class and an S class battery operated diesels, an 0-4-0 battery loco and a petrol rail-motor. Many of these locos can be seen on our web site — the track layout is shown on page 42 of this issue.

Work continues on the infra-structure for the Convention next Easter with the new storage shed now having been completed and the steel has been bought for the internal tracks in the shed. Work on the traverser has commenced and there will be enough steel left over for the new ground level 5" traverser to also be completed. Surveying for the new tracks and parking bays has also been completed and work should commence shortly when the sleepers arrive. *(Convention notes pg. 42)*

A letter has been received from the North-West Model Engineering Society offering a running day following the AALS Convention together with the opportunity of on-site camping while on the North-West Coast.

Evandale Light Railway & Steam Soc Inc
Location: *Rear of Falls Park, Evandale*
Public Running: *Every Sunday*
http://www.evandal-light-rail.org.au

Galston NSW

The scale timetable run in March was well attended. Early rain delayed the start but once it cleared, running conditions were pleasant. The timetable worked successfully with two sessions of two hours each. The organising committee has been re-organised as the Scale Railway Operations Committee to oversee future scale and timetable running events.

The Australian Miniature Cane Locomotive Gathering spent one day at Galston in April and a good day was had by all who attended. There were eight cane locos and 48 members and visitors in attendance, coming from around NSW and also from Victoria and Queensland. The locos ran on every part of the track with unusual operations for GVR like running all coupled and parallel running.

The new workshop has begun to take shape, new wire mesh fencing has been installed on the western boundary and a new concrete dish drain has been formed along the picnic area in front of the signal box. 210 lengths of recycled plastic has been obtained from South Australia which will provide 1050 plastic sleepers for use in the cutting and tunnel (wet areas) as well as insulated section/signal joints.

Hornsby Model Engineers Co-op Ltd
Location: *29 Mid Dural Road, Galston*
Public Running: *2nd Sunday*
http://www.sdr.com.au/hmecl/index.html

Hamilton NZ

A lot has been achieved in Hamilton in the last year. On the track there have been repairs to the viaduct, replacement of sleepers and ballast, and flagstones have been laid, the kitchen upgraded, the hoist has been installed and of course there was the outstandingly successful 70th Birthday Bash. This event (which was reported in the last issue) received over 300 registrations and 40 locos. Planning as now under way for the 2004 Convention, about which more details will come later.

A large group of members travelled to Havelock North for the Easter weekend and had a good time with the locals and members from clubs all over the North Island. This was followed about a month later by a visit to Thames for their open weekend which was equally enjoyable.

Two new passenger trolleys are underway which have been sponsored and another two are on the drawing board.

At the AGM Brian Clark was re-elected President, Jerry Lewis is Vice President, Geoph Howarth is again Treasurer *(must be about 23 years now, Geoph)* and Valerie Clark is again Secretary.

Hamilton Model Engineers Inc
Location: *Minogue Park, Tui Avenue, Forest Lake*
Public Running: *Every Sunday*
http://mysite.xtra.co.nz/~HME/page1.html

Maidstone NZ

The club have held the first passenger run on the new 7¼" ground level track. This run was to support the opening of the new Upper Hutt Maxpark, a new childrens playground, also located in Maidstone Park. Members from nearby Hutt Valley and Kapiti clubs helped out on the day and the locos which ran on the new track were Peter Carr's *Owain Glynduyr*, Gavin McCabe's #66, Brian Wheelers *Bridget*, Grant Alexander's petrol Hunslet and Colin Burleigh's battery electric Ec11. In addition, on the old track were Dave Brownlow's 5" *Belton Manor* and 3½" *Evening Star*.

At the AGM Alan Kemp was elected President and Frank McClelland is V.P. Other positions remain unchanged.

The winter months provide the opportunity to carry out maintenance on the old track and most of the problem pier head blocks have been replaced and the intention is to install another rail to restore the 2½" track. Looking at other work, 100 wheels have been turned for the 7¼" track. These will be used on six passenger trolleys and a battery electric loco which is being rebuilt as a club engine with the rest being sold to members

Maidstone Model Engineering Soc. Inc
Location: *Maidstone Park, Upper Hutt*
Public Running: *Every Sun pm Oct-April*

Mangere NZ

What a great weekend! For the first time in years the MLS had sunshine over

most of the three days of the Queens Birthday weekend. Locomotives came from all over the North Island and the public arrived in droves. The latest engine from Ikon Locomotive Works, a second 7¼" Shay, named *La Fayette* made its public debut and performed admirably. By the time you read this it will be in the hands of its owner, Alf Bond at Tullamarine Live Steamers.

Peter Hudson and Toni Stevenson have loaned the almost completed 5" freelance Jubilee style locomotive built by the late Jack Hocking to the MLS club. As with all Jack's models, the workmanship is absolutely first class. The club has had a glass case made and the locomotive will be on permanent display in the clubrooms.

Manukau Live Steamers Inc
Location: *Mangere Centre Park, Robertson Road, Mangere*
Public Running: *Every Sunday*
http://sites.netscape.net/manukaulivesteam

Maryborough Qld

This is MELSA's 25th anniversary year

The club is custodian of ex QGR B15 Converted Loco No 299 (Walker's No.1) on behalf of the city of Maryborough. Although it has been retained in steaming condition over the years (albeit at a much reduced rate of pressure due to a lack of foresight by someone), it is not up to mainline excursion work. Another local organization is now seriously looking at a full restoration to mainline running condition, pending the findings of upcoming inspections.

The annual Spring Festival, the occasion of the club's invitation run is not being held this year. Instead, the activities of the festival will be incorporated into a Trainfest to be held towards the end of September. Maryborough has a rich railway heritage with the Walkers engineering works in the town, the replica of vertical boilered *Mary Ann* providing rides, 299 (already mentioned) and a railway museum at the local heritage listed station.

Club members have several locomotives under construction, some two dozen at the latest count.

Model Eng. & Live Steamers Assoc
Location: *Queens Park, Maryborough*
Public Running: *Last Sunday*

Millswood SA

One of the hottest places at SASMEE during the summer months is steaming up a loco at the 7¼" gauge turntable area. In the future this will change as five well advanced eucalyptus trees have been delivered to provide a protective canopy as they grow. Four were planted in the turntable area and the fifth one was planted near the traction engine track.

A video of Kevin Dale's extensive 5" railway at Quorn was shown at a recent meeting. This railway includes a station, loco facilities, countless turnouts and sidings, bridges, tunnel and some 500m of track which wanders off into natural bush.

Colin Cook was awarded Life Membership in recognition of his long and valued service to the club.

South Australian Soc of Model & Exp. Engineers
Location: *off Millswood Cres, Millswood*
Public Running: *1st Sun & 3rd Sat*

Moorabbin Vic

The Kindred Societies Weekend was very successful with 92 names in the book and 17 locos on the larger tracks. There was also plenty of action on the G1 track and the Gauge 0 line which happens to be part of the front track. A spirit fired freelance 2-6-0 (G0) with 7 wagons and a van with a wick burner, piston valves (non reversing) ran more than 4 circuits of the track. Also running was a Hercules with double acting oscillating cylinders, a French 0 gauge mainline diesel, a 1950's Australian *Scorpion* and a Roundhouse-Brandbright Main 2-footer *Liberty Bell*.

There were also some models on the display stand like Keith Hartley's 0 gauge A2 (*what else?*) tender and wagon, an Emmett tram and a 3-cylinder Enterprise just to name a few.

Steam Locomotive Society of Victoria
Location: *128 Rowans Road, Moorabbin*
Public Running: *1st Sunday*

Morphett Vale SA

The highlight in recent days has been the completion of the 200m new Subsidiary Main Line (SML). The work began in December and the track was all down by late April, and following ballasting, levelling, etc. the first revenue train should be using it by August. The track includes 5 switches (2 normal, 1 bladeless) and a 20m spur line located at the rear of the carriage sheds and used 1040 plastic sleepers, 50 tonnes of dolomite, 60 lengths of new rail and approx. 4190 Tek screws. This means that almost all trackwork is now 'T' rail section and about 55% is now laid on plastic sleepers. The SML allows two trains to depart the station simultaneously

Morphett Vale Railway Inc
Location: *Wilfred Taylor Reserve, Wheatsheaf Road, Morphett Vale*
Public Running: *2nd & 4th Sunday*

Newcastle NSW

It is twelve months since the Edgeworth Model Train Landcare Group was established and to date work progresses well along Cocked Hat Creek with the morning glory vine being removed from the club's side of the creek. The third load of mulch is being used and mulching in the area near the steam shed is nearing completion as is the area around the Hill. With the rock wall near the clubhouse being finished the whole area looks good. 400 plants have been set out and work to date has taken 310 person-hours.

Lake Macquarie Live Steam Locomotive Soc. Ltd
Location: *off Velinda Street, Edgeworth*
Public Running: *Last Sunday (ex. Dec)*

New Plymouth NZ

A large contingent of members attended the gathering at ASME in Auckland over Easter and featured well at the awards presentation. Martin Smyth took out the Concours d'Elegance with his *PV Baker* and Ted Booth's lathe received a highly commended certificate from the judges.

The roller shed has gone off to join the steam roller and the contract for construction of a new shed has been awarded. Council have given approval for removal of the tree by the underpass and this will go at the time the earthworks are done for the new shed.

New Plymouth Soc. of Model Engineers
Location: *cnr Liardet and Gilbert Sts, New Plymouth*
Public Running: *Every Sunday*

Perth WA

The Stanbridge project is drawing to a close with the piers all done and the spans in position. It should be open to traffic by now as the official opening was scheduled for the June public run day. The 5" loco facility is to be bricked in, the necessary permit having been received.

The AGM was reasonably well attended and the outcome was Rod Pitt continues as President and Ken Belcher is still Secretary. Gerry Broom was awarded "Clubman of the Year".

Castledare Miniature Railways of WA Inc
Location: *Castledare Place, Wilson*
Public Running: *1st Sunday*

Petone NZ

The AGM was held in June for the first time and the members must be happy with the job the executive are doing as they have kept them on!

Plans are afoot for rail access to the rear of the clubhouse to facilitate trolley handling which has become very heavy. This will involve two trailing points in the mainline entry to the storage areas which themselves will need another four sets of points, one to get back to the tunnel and three to come back to storage roads in the clubhouse.

Hutt Valley Model Engineering Soc. Inc
Location: *6 Marine Parade, Petone*
Public Running: *Every fine Sunday*
http://www.steammachine.com/hvmes

What has your club been up to?

We all like to keep in touch!

Send a brief note to tell us!

Or post a copy of your **newsletter** — but make sure you use a highlighter pen to show the item you would like us to publicize. Remember to concentrate on news that appeals to AME's wide range of readers.

Warner Qld

We're continuing to improve the Warner site with an extra contribution from the "golden oldies" who are spending more and more time each month on the projects (keeps them young I'm told). The pergola now boasts an interlinked, stepped retaining wall and the area will soon be paved. We have been fortunate to have the use of a members heavy digging equipment and so major earthworks are happening which will eventually form the cuttings for the new track and approaches to the new bridges. The round house has the floor concreted and catch drains installed. The main bridgework is well advanced with the second span almost complete and most decking laid. An upgrade of the existing bridge will also form part of this work. The elevated track improvements include concreting the floor of the steaming bays and the reticulation of air and water. Next task will be to replace the steel pier track supports with concrete. Picnic tables must be related to rabbits, as they appear to be springing up in all the right places and already are in full use during running days. Improvements to fencing and the library are also in progress.

To visit Contact Secretary, PO Box 322 Everton Park 4053.

Qld Society of Model & Exp Engnrs Inc
Location: *Lot 5, Warner Road, Warner*

Public Running: *None*
Members running Day: *2nd Sun ex Dec*
http://www.steammachine.com/qsmee/

Farewell

We say goodbye and thankyou to these model engineers who have passed on:

John Davies (SLSLS West Ryde)
Keith Freebody (ex Canberra SMEE)
Tony Halling (Auckland SME)
Ken Holton (SLSV Moorabbin)
Bill Rogers (Auckland SME)
Ken Williams (Thames SGR)

and extend our condolences and best wishes to the family and friends they leave behind.

Coming Events

1 to 2, 8 to 9 15 to 16 September
Mudgee Wine — Mudgee NSW
The Mudgee Miniature Railway invites all model engineers and interested people to come and join us on any of the above weekends for the annual Mudgee Wine Festival. Track is 3½"/5" ground level located 6km north of Mudgee on the Ulan/Cassilis Road. Track open from 9am Sat (no public) with BBQ tea and night running. Sunday is normal public running day. Also ample room for traction engines, etc. As accommodation can be at a premium during the Festival, you should organize asap. Further details on accom. And other attractions from the Mudgee Visitor Information Centre on Freecall 1800 816304 or (02) 6372 2853. You can camp at trackside, but no power. Anyone intending to come contact Peter King (Sec.) (02) 6373 3626 or write to PO Box 373, Mudgee 2850

15 September
All Comers' Day — Box Hill Vic
Once again everyone is invited to come and sample some good old fashioned Box Hill hospitality. BBQ lunch and afternoon tea provided. Boiler certs a must. Contact (03) 9898 2671

29 September to 1 October
Annual Steam Up — Port Augusta SA
Port Augusta Model Engineers invite all train buffs to this annual event at Homestead Park, Elsie Street, Port Augusta. 5" ground level track with minimum 40ft radius. Come and enjoy a weekend of running and conversation. Further details from G Eberhard (Sec.), 5 Higginson St, Port Augusta 5700 (08) 8642 4246 or Ernie Riding (Pres.) (08) 8642 3858 or email: earding@augusta.gulf.net.au

12 to 14 October
Annual Birthday Run & AALS Interclub Run — Galston NSW
This year the Hornsby Model Engineers are combining their Birthday Run with the Interclub Run over 3 days (Sunday will be open to the public).

13 to 14 October
13th Australian Miniature Traction Engine & Steam Road Vehicle Rally — Mannum SA
This year, for the first time, the rally is being held in South Australia at Mannum, on the Murray, 100k east of Adelaide. Mannum has a long association with steam, the birthplace of the Murray paddle steamers, the Shearer steam car and permanent home of the restored PS *Marion.* The rally is already being strongly supported by the Mid Murray Council who will underwrite our insurance and open the Showgrounds where the Mannum Football Club have their oval and club house — our focus. There will be a Main Street parade from the showgrounds to the town centre and return from 11 am on Saturday. Registration form will be available from April. More details, contact John Levers (08) 8569 2842

20 to 21 October
Cobden Spring Festival — Cobden Vic
Members of the South Western Model Engineers invite you to this annual event at Railway Park, Cobden. We will be open Friday for the early starters through to Monday for those who want to stay and play. All gauges catered for and there are no night running restrictions. Public running on Sunday, static display area available. Diversions include an 18-hole mini golf and the comfort of the Railway Refreshment Rooms. Plenty of good priced accommodation in the area and Saturday night dinner at the Golf Club. Further info call John and Val Wiggins (03) 5595 1430

20 to 21 October
Blowfly Rally — Bathurst NSW
No details available

27 to 28 October
DVR 40th Birthday — Eltham Vic
You are all invited to come and help the members celebrate Diamond Valley Railway's 40th anniversary of operations. Club will be open from 2pm to 8pm Friday to receive visitors. Saturday — Fun Run, no public, day and night, lunch and dinner provided. Sunday — public running 11am to 5pm, fun run before and after, BYO meals. Register by Sept 18. Ph. (03) 9432 5703 (5pm to 9pm)

2 to 4 November
Annual Invitation Run — Wagga Wagga NSW
Contact David Font (Secretary) on (02) 6921 4762 or e-mail dfont@tpg.com.au

3 to 4 November
Annual Invitation Days — Euroa Vic
Euroa Miniature Railway is hosting an Invitation Model Engineering Weekend, with Club and night running on the 3rd and a public running on the 4th of November, as our contribution to the "Euroa Wool Week Festival". Traction Engines, Models, Model Engines and Boats are all welcome. Your Club is welcome to put a float in the Wool Week Parade on Saturday, to publicise your activities. Contact Sec. James Carter on (03) 57951011 or 0428 554 106 or PO Box 206, Euroa 3666

10 to 11 November
Railex 2001 — Evandale Tas
ELRSS will again hold Railex this year at Evandale. All people interested in model and miniature railways, model aeroplanes and other models in general are invited to attend this anual event to be held at Evandale 15 km south of Launceston. Latest information may be found at http://www.evandale-light-rail.org.au Coordinator is David Cooke 03 6327 2529

10 to 14 January, 2002
Modex 2002 — Palmerston North, NZ
The Palmerston North Model Engineering Club is hosting MODEX 2002, the NZ International Convention and Exhibition. More details on this exciting event will be published in later. Contact address is MODEX 2002 Registrations, 12a Hereford St, Palmerston North, New Zealand. Ph. 64-6-355-7000, Fax 64-6-355-7008 or email pnmec@clear.net.nz

28 March to 1 April, 2002
AALS Convention — Evandale Tas
The Evandale Light Railway and Steam Society will be hosting the next AALS convention at Evandale 15 km south of Launceston in Tasmania from Thursday 28th March 2002 - Monday 1st April 2002. Ground level 7¼" and 5" combined, separate 5" ground level and 3½" and 5" combined raised track, all with separate steaming bays and loading ramps. Book early if coming by boat! Spaces fill up early at Easter time! Latest information may be found at http://www.evandale-light-rail.org.au Coordinator is Peter Lawson 0363981676 6 Monica Place Perth Tas 7300 Email dmlawson@optusnet.com.au

AALS 46th Annual Convention

Evandale, Tasmania — 28 March to 1 April, 2002

Evandale is an historic village, 20k south of Launceston and 5 minutes from Launceston Airport (100k from the *Spirit of Tasmania* ferry terminal at Devonport). It is home to the Evandale Light Railway and Steam Society which is within walking distance of all accommodation places in Evandale.

Travel and accommodation

As this is the first time the convention has been held in Tasmania, two travel and accommodation options are being offered to help you get the most from your trip. The first option is through Groups Tasmania (free call 1800 462 827) offering travel on the *Spirit of Tasmania*, accommodation, day tours, car hire, etc (ELRSS receive a percentage). A booking form has been sent to clubs.

The other option is to make your own arrangements. There are several **daily flights** by Qantas and Kendall Airlines (Ansett) into Launceston. If you prefer to travel by **sea**, the *Spirit of Tasmania* sails regularly between Melbourne and Devonport. It provides overnight accomodation, full buffet dinner and continental breakfast. You can take your vehicle for as little as $40.00 one way (conditions apply). Reservations on 13 20 10 or internet www.tt-line.com.au (Book early as Easter is a peak time.)

There is a large range of **accommodation** conveniently located to the venue — caravan parks, bed and breakfast, motels, hotels and holiday units. Besides Evandale and Launceston, there are other towns close by — Hadspen, Longford and Perth. Which ever accommodation your choose, book early!

Track and facilities

Entry to the track is through the Evandale Market, also known as **Falls Park**.

Referring to the site drawing below, there is a **580 metre ground level 7¼" track**, 360 metres being dual gauge with 5". There is a **separate 5" ground level** track which provides 370m single lap or 760m figure eight running and also the 177m **elevated 5/3½" track**. The dual gauge main line is 25mm x 12mm flat bar (on edge), while the 5" only circuit is 25mm x 8mm on plastic sleepers (which could limit the size of locos on this track). All tracks have raised **steaming bays** with 240 volt and water.

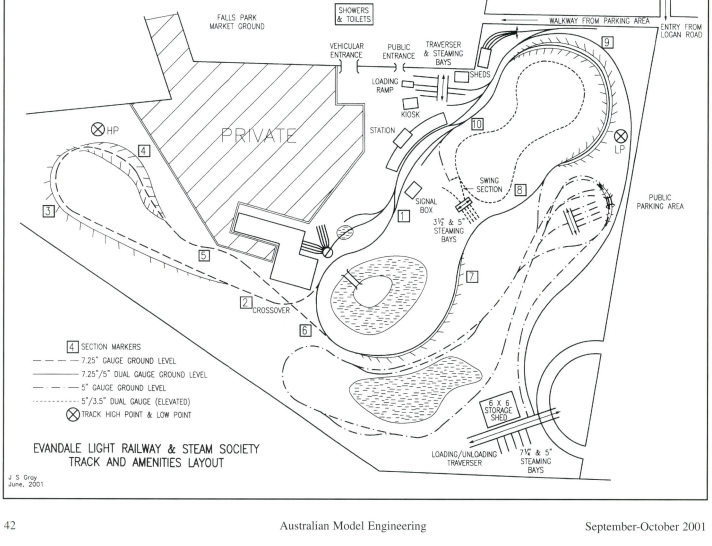
The ground level tracks have a **traverser** type ramp unloader while the elevated has a single raised ramp. There is a **turntable** and plenty of **sidings**. Lock up loco storage before and after the convention by prior arrangement.

Other places of particular interest in Tasmania are —

Pearn's Steam World, Westbury	Don River Railway, Devonport
NW Model Engineers, Ulverstone	Wee Georgie Wood, Tullah
West Coast History Centre, Zeehan	Ida Bay Railway, Ida Bay
Tas. Transport Museum, Glenorchy	Bush Mill, Tasman Peninsula
Red Water Creek Railway, Sheffield	Hobart ME, Flagstaff Gully
Derwent Valley Railway, New Norfolk	Alpenrail 0 Gauge, Glenorchy

ELRSS are on the web at www.evandale-light-rail-org.au

Registration forms are available from the Convention Convenor, Peter Lawson, 6 Monica Place, Perth. Tas 7300. Ph (03) 6398 1676 or email: dmlawson@optusnet.com.au

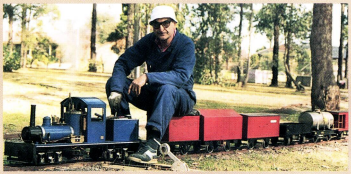


One Man's Models

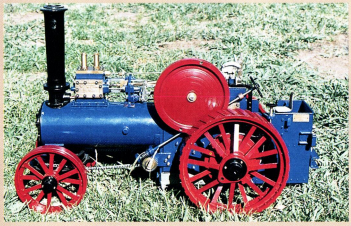
Shawki Shlemon

Photos supplied by Shawki Shlemon

Shawki Shlemon is a member of the Western Districts Live Steamers in Sydney. This is a small selection of the many items he has been building since making a start in 1980. Other models include a 5" Atlantic, a 7¼" Rail Motor and a 3½" *Conway* as well as several other model at various stages of construction, the next completed probably a 5" freelance Garratt.



Shawki with his Shay at the Western Districts LS track in 1993



This 1½" traction engine now lives in a glass case

2½" gauge C36 waiting for its steam test — built specifically to go in a glass cabinet in the sitting room.

This is one of Shawki's two 5" gauge Lions *in the steaming bays*

A slightly younger Shawki with Clayton steam lorry in the back yard

This 5" SMR 10 class was stolen last December

A proud man and his 5" gauge C38 in the WDLS steaming bays

Z13 class in 7¼" gauge in the steaming bays in Canberra. The cattle wagon was also stolen last December.

We would like to show your work!
Why not send us some colour photos of your models so we can all enjoy them.
Sharing is part of the fun!

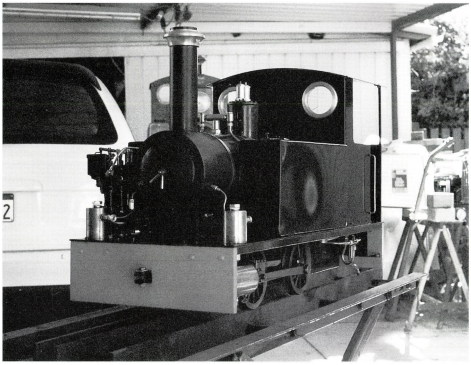
Is This the Fastest *Blowfly* Yet Built?

Story and photos by Steve Reeves

When the Northern Districts Model Engineering Society, in Perth WA, decided to open its doors to the general public in the middle of last year, it became apparent that motive power was needed urgently. So Phill Gibbons and I looked at the possibility of building something suitable to help out. The engine had to be simple in design, free steaming, powerful enough to pull a good load and quick to build. After considering several designs, we decided to go 'Australian' and chose the *Blowfly* design.

As readers will know, James Gidden (known as JD) and a friend began coming to my workshop where they began a *Blowfly* each. This was when they were 15 years of age and still at school. However by the time they had their chassis wheeled other things like girls and jobs began to take their attention, and so the projects stalled. JD also went to NSW for several years, though during this time he would visit WA on holidays and sometimes visited me. Often he would talk about seeing the engine finished and put to good use. I suggested that it would make a good club engine for NDMES and he agreed, so the chassis, castings and other parts were left with me. These were carefully packed away while other projects were completed, something which was to take a few years.

Phill suggested that it is possible to build an engine in six months, providing things are planned out well, you do not get side-tracked on other things and you apply plenty of elbow grease. This was an appealing challenge. So the stage was set. JD was approached over his engine, which we acquired as part donation/part purchase, and when NDMES heard that they might be getting a club loco, they sent a very nice letter of thanks to JD.



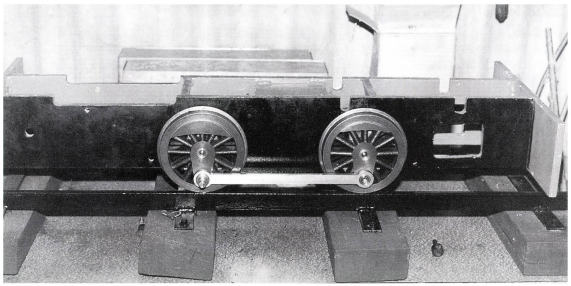
The completed engine. Note the two lubricators sitting above the front buffer beam

Phill took on the chassis and had it running on air within six weeks, taking about 10 to 12 hours a week on the project. Unfortunately, due to JD's inexperience, some of the parts had to be remade. Phill also did some experimenting, the valve timing, for example, has been set at 80% cut off with no lead. This has proven to be very effective with the engine running very freely and having plenty of power. Home made cast iron piston rings have been fitted as well as manually operating drain cocks of the LBSC pattern.

The smokebox has a dummy door turned with the ring which is a push fit into the smokebox. This method gives easy access to the pipe work and cleaning out the ash is easier too.

My contribution is the boiler and fittings. The boiler is the slightly larger version with a rearranged tube layout giving one extra tube. A fusible plug and an extra blowdown are also fitted and the step brazing process was used for joining the components. This involved the use of Tobin bronze on the boiler barrel, throatplate and inner firebox in the first brazing operation. For the second brazing, 235 silver brazing alloy is used on the tubes, dome, smokebox tubeplate, backhead and stays. The final operation used 245 silver brazing alloy on the foundation ring and any leaks found on the hydraulic test.

The clack valves are mounted on a Tee shaped turret on the front of the boiler. The steam turret was made about 25mm taller with the steam valves spaced



The Blowfly chassis as received from JD

wider apart for fat fingers to use. Extension arms are fitted to the handles to give finer control. We elected to have an injector on the left hand side of the engine with a doubled up LBSC Duplex pump I made several years ago on the right hand side.

Club member Ernie Redford has his own engineering business and kindly offered to make the tanks, which are made of TIG welded stainless steel. TIG welding is an interesting process to watch as the operator uses an electrode similar in size and shape to a pen with the welds virtually written on.

Good friend Mick Fiora of Fiora Engineering supplied the remainder of the plate work. We cut out and filed the parts to shape and Mick organized the bending and shaping. Phill turned up the brass window frames made in two halves press fitted through the cab.

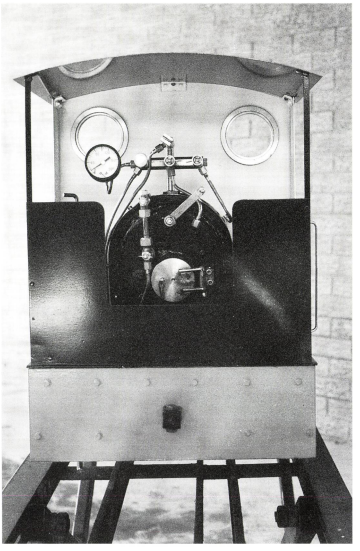
We painted the engine using good quality automotive aerosol cans. The parts were prepared in the normal with a primer as well as the finish coat. We decided to lag the boiler, and to save some time polishing, the boiler bands are made of stainless steel. A fabricated steel painted dome will be added in due course.

The smokebox plumbing and the boiler to mainframe mounting bracket was altered so that the boiler/smokebox assembly can be removed in a few minutes. This involves four screws on the smokebox saddle and the mounting bracket on the backhead. Observant readers will notice a second lubricator has been fitted. What can't be seen is an LBSC type snifting valve mounted on the side of the smokebox behind the steam pump.

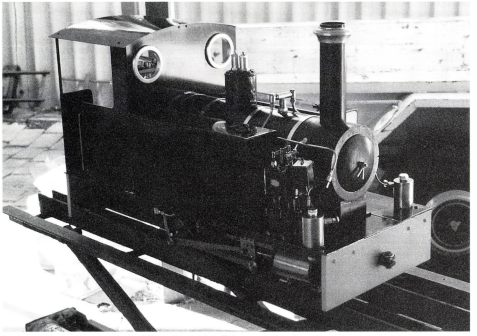
We elected to run the engine on char so the fire bars are made of stainless steel. To catch the ash a three-sided ash pan push fits between the frames with a 6mm lip on the base so that a small amount of water will lie in the bottom of the ashpan to catch hot embers. A simple mesh spark arrestor has also been fitted to the chimney and can be easily removed for steam raising purposes.

This engine is the most free steaming engine I have ever come across and its power is amazing. It is proving to be a very useful club engine and is very tolerant of different driving styles. Our club track had steep grades but that does not worry the engine at all and two passenger wagons can be pulled with ease and no loss of adhesion. In fact I feel the engine could pull more.

The first steam-up at the club track was done within the six month period, but only just! In fact the cab and tanks were not made so the tender from my 5" gauge 4-6-2 *Helen* was used. Two months later the engine ran in its completed state, so in fact it took us eight months all up. This quick building time was achieved as both of us put in a lot of time each week and every stage was carefully planned out with materials bought many weeks in advance.



A look in the cab. Note the stainless steel firehole door.



The other side of the completed engine

I would not expect the first time engine builder to be as quick. However, when ten to twelve hours per week are spent on an engine of this type, it can be built over an 18 month period easily. What this project shows is that if there is a need and your determination is strong enough, things can be done quickly. Certainly NDMES are not complaining!

Footnote: At the time of writing the engine has been running for four months. New drivers have found the steam pump a challenge so it has been replaced with a hand pump on the rear buffer beam. The lubricators have LBSC type drain cocks, with the top filling nut fitted with extension arms. These two modifications enable the lubricator to be filled without burning ones fingers. Also a special carry cage on wheels with lifting arms has been made to protect the engine while being transported.

American Railways of Note

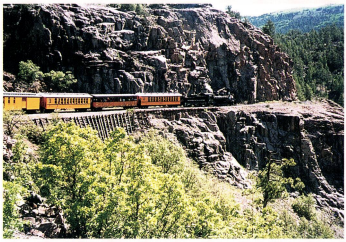
Durango & Silverton Narrow Gauge Railroad

Story and photos by Murray Lane

K-36 No. 482 moving up to the head of the 8:30am train to Silverton

History

This railroad was a small section of the Denver and Rio Grande Railway Company, which covered most of the state of Colorado, with one branch line to Santa Fe in Mew Mexico, in the latter part of the 1800's. The Durango to Silverton section was built to service the mining area in the San Juan Mountains around Silverton, and was completed in 1882. As a result of major reorganization the company name changed to Denver and Rio Grande Western Railroad in 1921, and the Silverton branch was subsequently sold to the Durango & Silverton Narrow Gauge Railroad Company. In 1981 the line, equipment and rolling stock was sold to a private individual for 2.2 million dollars, who pledged to continue the opera-



View from the last car on the high line heading towards Silverton

The Animas River 100 metres up the line from the previous photo

Crossing the high bridge above the high line on the return trip

Alongside the Animas River on the way to Silverton

Aerial view of K -28 No.478 working hard up the high line to Silverton. D & S Publicity photo

tion and improve the line. The Durango Silverton line, is now one of the major tourist attractions in Colorado.

The line has had its share of disasters including, severe snow storms which closed the line for several weeks in some winters due to the heavy falls of snow, and blockages due to snow slides. In 1921 a mixed train hit a rockslide 20 miles north of Durango and the two engines jumped the track and fell into the Animas River. A major washout in 1970,caused by high rainfall in the Silverton area, either badly damaged or entirely destroyed 25 miles of track south of Silverton. During the early morning of 10/2/89 a fire started in the in the roundhouse machine shop at the Durango depot. The building was destroyed and six of the engines were damaged. Within a year the engines had been repaired and a new multi million dollar round house and machine shop complex had been built.

Locomotive stock in 1994

The company has nine 2-8-2's Mikado locomotives and one 2-8-0 locomotive.

Above right: K-28 No.476 quietly simmers at Silverton while it waits to depart for the return trip down to Durango.

Right: a typical street scene in Silverton

Type	Number	T.E. (ft/lbs)	Weight (Tons)	Pressure (psi)	Year Built	Year Rebuilt	Service
K-28	473	27,500	127	200	1923	1989	Yes
	476				1923	1989	Yes
	478				1923	1989	Yes
K-36	480	36,200	143	195	1925	1985/89	Yes
	481				1925	1981/89	Yes
	482				1925	1992	Yes
K-37	493	37,100	154	200	1902	1928	No
	498				1902	1930	No
	499				1902	1930	No

Inside the parlour car Almosa *which is attached to the rear of the train. It costs a little more to ride in this car*

There are three different types of Mikado's as per the above table

The solitary Baldwin 2-8-0 was built in 1887 and restored in 1958. This engine is not in service.

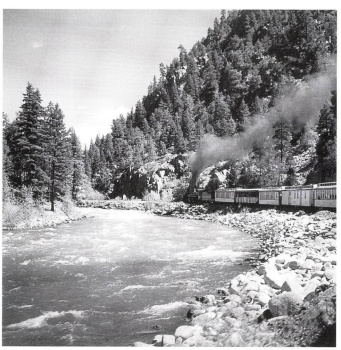
There are a total of 47 cars of different configurations. These all have a similar appearance with clerestory rooftops and the majority are painted a bright yellow.

Route

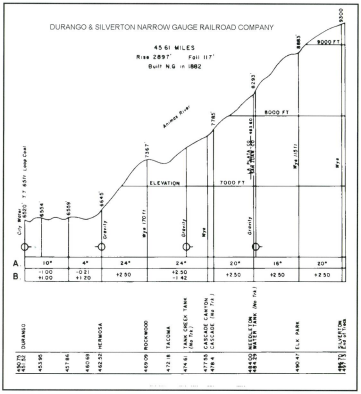
The three foot track runs north from Durango to Silverton following the course of the Animas River and climbs 2,768' in the 45.5 mile route (an average 1 in 86 grade), and crosses the river four times. The track moves away from the river, during the first stage of the trip, and after 11 miles it then climbs a 1 in 44 grade for the next 6.5 miles to travel around a shelf suspended above the considerable drop to the river below in the Animas Canyon. This section of the track is known as the high line. The track follows the river closely from this point to Silverton. The river gradually climbs up to just below the track for the latter half of the trip, where the track runs close to the banks on either side, as it crosses back and forth across the river. The trip ends at Silverton at an elevation of 9,235', in a basin surrounded by 13,300' mountains.

General

This is a very interesting train ride with terrific scenery. The return trip takes a full day. The stop in Silverton is around 2 hours, which gives plenty of time to have lunch and walk around this old and interesting town. It is also the time to have a good close look at the locomotives. Up to three trains a day, depending on the time of the year, run this trip, and some times double heading of locomotives is used. The governor's carriage (*Alamosa* Parlor Car), on the back of the train is a preferred car to ride on as it allows good photographs of the front of the train on the curves as seen in some of the photographs. It also has a bar, and opens as soon as the wheels start rolling. Prior booking is essential. Guided 45-minute tours of the shop complex and yards are offered, but any other entry to this area is not allowed.



Running along the right hand side of the Animas River, six miles south of Silverton



Piston and Valve Rod Glands

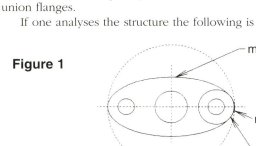
by John Davies

Drawings by the author

This method of producing these with a satisfactory cosmetic appearance is not new, but may not perhaps be widely known. As there are often a number of these required in a model, it was decided to make case-hardened mild steel templates which would also serve hopefully for other models, and also for steam union flanges.

If one analyses the structure the following is noted:

Figure 1



1. The outline is elliptical. There is a major curve of the ellipse. This can be eccentrically turned.
2. The minor curve is very close to the spot-face diameter of the securing stud/nut. Its circumference coincides also with the outside diameter of the stock material used to make the gland.
3. Blending the 2 arcs is surprisingly easy and quick, and it was felt that there was no need for a second template to control the file around the small diameter and blended 3rd arc.
4. The central hole for the steam gland can be used for fixing the blank to the eccentric jig.

Procedure

The method will work for templates or gland, and pipe union flanges and their castings.

Make up blanks to the appropriate outside diameter, these are usually in bronze, or come as castings. The outside diameter should be the same as the gland flange length. The register for piston rod or valve rod glands is also accurately turned. And the central hole drilled, reamed or bored. For the templates mild steel rod was used. After facing, scribe the PCD of the fixation holes, and a straight line across the face at centre height. This does need to be easily seen. A clearance drill should be made in the centre corresponding to the rod diameter or the steam pipe internal diameter. Part off the templates at say $^1/_4$" thick.

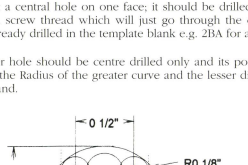
The eccentric turning jig

Next the eccentric turning jig should be made up. About 2" long and $^3/_4$" x $^3/_4$" square mild steel. The size, while not critical, makes a considerable difference so far as convenience is concerned.

Mark out a central hole on one face; it should be drilled and tapped for a screw thread which will just go through the clearance hole already drilled in the template blank e.g. 2BA for a $^5/_{16}$" hole.

The other hole should be centre drilled only and its position depends on the Radius of the greater curve and the lesser diameter of the gland.

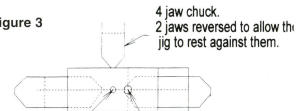
Figure 2



In the example above the lesser diameter is $^7/_{16}$" and the Radius of the greater curve is $^{17}/_{32}$". The offset is given by subtracting half the lesser diameter from $^{17}/_{32}$", (this latter being found by trial and error on the CAD or the drawing board). Thus in the example shown $^{17}/_{32}$" minus $^7/_{32}$" = $^5/_{16}$". So the second hole (Centre drill only) is $^5/_{16}$" from the first.

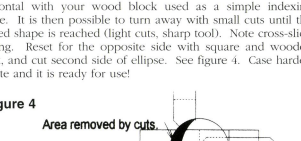
The jig is placed in 4 jaw chuck — 2 jaws reversed to support it. See figure 3.

Figure 3



The centre drilled hole is 'centred' with the tailstock centre and the jaws tightened in the usual way. The template blank is fixed to the jig. The vertical line on the face of the blank (see above) is aligned to the lathe bed with a square and with jaws horizontal with your wood block used as a simple indexing device. It is then possible to turn away with small cuts until the desired shape is reached (light cuts, sharp tool). Note cross-slide reading. Reset for the opposite side with square and wooden block, and cut second side of ellipse. See figure 4. Case harden to taste and it is ready for use!

Figure 4



The table below shows the offsets as worked out on "Autosketch". It became apparent that the same template design would be also for steam union flanges. However, because the union usually has a shoulder into which the pipe is soldered, there is more crowding of the space around the nuts, and less space for the spanner. For this reason the fixation bolts/studs are kept as far apart as possible within the constraints of scale. It would probably be wise to check the position of these holes prior to drilling to ensure that they neither overhang the edge of the flange nor make it very difficult to use a spanner.

Steam Glands.

Length	Small Diameter	Radius of Major curve	Offset	fixation screws. BA.	Srew AF Diam.	Dist.apart of fixation screws
7/8"	1/2"	19/32"	11/32"	6	0.2	5/8"
7/8"	7/16"	11/16"	15/32"	6	0.2	5/8"
3/4"	7/16"	17/32"	5/16"	8	0.156	9/16"
3/4"	3/8"	19/32"	7/32"	8	0.156	9/16"
11/16"	3/8"	7/16"	1/4"	8	0.156	17/32"
11/16"	5/16"	19/32"	7/16"	8	0.156	17/32"
5/8"	3/8"	13/32"	7/32"	8	0.156	13/32"
5/8"	5/16"	1/2"	11/32"	10	0.117	15/32"

This article is reproduced from Grate News, *the newsletter of the Tamworth & District model Engineers Inc.*

A New Club in New Zealand

by Angus Davis

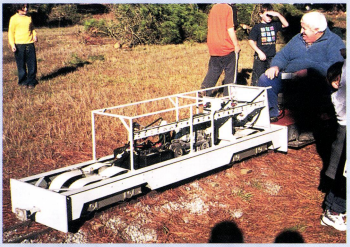
Photos by the author except where indicated

With the South Island Alps shimmering white across the Canterbury Plains, a wintry blue sky and welcome sunshine, the first train began to roll for the Christchurch Live Steamers on the Queens Birthday holiday weekend in June.

After a casually constructed 7¼" gauge with light rail and a container for an engine shed the 'Steamers' became officially constituted in May 2000. This is an independant group under the umbrella of the Canterbury Steam Preservation Society which occupies a 30 acre site on reclaimed land known as McLeans Island, 10 minutes from Christchurch International Airport. Since those days a 560 metre track has been built from heavy steel welded in sections of about 36 metres, which gives nice transition curves. Two engine sheds have been erected with water and electricity installed and a six metre turntable has been built. A triangle (or Y) is to be built to enable whole trains to be turned, but the next priority is to install the engine shed track work and a passing loop on the mainline. Three steam locomotives are currently under construction.

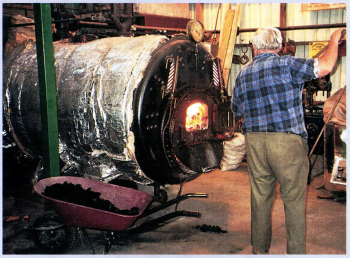
Meanwhile the 3"6" Bush Railway with its famous 5-way stub point/switch is in good running order. The 0-4-0 Fowler is stripped down for overhaul, the Price loco is available for service as are the Planet diesel and Price petrol shunter. The Ogilvie Railcar is being considered for restoration, a very long term job.

The steam exhibition hall has been enlarged with concrete floors and a number of unrestored engines moved in. The centre of attention over the weekend was the recently completed Robey mill engine. Built in the UK in 1896 it came to us from Brownlees Sawmill and was renovated and refurbished in just nine months. It ticked over nicely for the three days having only recently steamed for the first time in thirty years. Three traction engines reside in a separate building, completed last year, and these run as required.

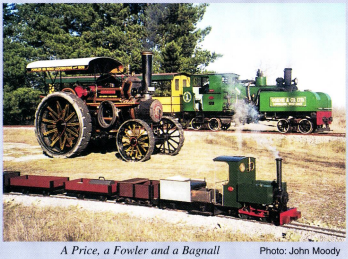


Alan Grueber's petrol electric is about the mid construction stage

Michael Stokes inspects Noel Britt's petrol hydraulic whilst Alan Stokes backs up his petrol hydraulic Harlech Castle



The boiler which provides steam for the exhibition hall



A Price, a Fowler and a Bagnall Photo: John Moody

The exhibition hall with the Robey mill engine to the left

Discussion Forum

Are we at the crossroads — large versus small?

In the last issue, several contentious issues were raised in the Letter Box *columns which could have an important influence on the future direction of model engineering in this country, particularly with regard to miniature railways. As Editor, I offered space in the following couple of issues of* AME *for a* Discussion Forum *so that readers may air their views ... djp*

The large vs small locomotive debate

The current 7¼" vs 5" gauge debate is interesting, with many valid points being made. Vigorous and robust discussion is to be expected, but it must remain constructive rather than divisive. In particular, it is disappointing to hear talk of fragmentation into a number of specialist associations.

We are already a small group in a world full of predators. There are enough outside interests who would like to sue us, regulate us out of existence, or develop supermarkets on the sites of our railways. We should be closing ranks to defend our common interests, not fragmenting into conflicting factions who can be isolated and picked off by outsiders. The diversity within our groups must be seen as a strength, not a problem, and above all we been to be uniting to support each other, not fighting a civil war.

Dr Richard Stuart

5" or 7¼" — are we at the crossroads

No we are not at the crossroads as far as 5" or 7¼" gauge are concerned. I think we are at the crossroads as far as standard gauge and narrow gauge is concerned.

In real life that is full size (not models) the narrow gauge engines were not giants compared to others, but they ran on narrow gauge track and did not mix with standard gauge engines.

In the hobby we have got it upside-down or inside-out, however you see it. We do not start with the engine and scale it down to 1¼16" to the foot or 1½" to the foot and fit a suitable track to it. We start with the track and select a standard track on 5" or 7¼" gauge and match that to a narrow gauge engine and scale everything to suit. This finishes in the giants we are now arguing about.

My opinion is that there should be standard gauge clubs and narrow gauge clubs. The standard gauge clubs should have loading gauges to prevent narrow gauge locos to run on their tracks, every person to his or her liking and all of us will be happy.

Shawki Shlemon

Model engineering vs light engineering

This topic really gets on my nerves! Will someone please explain to me the difference between the two? Why, all of a sudden is it that anything bigger than 5" gauge in some people's eyes becomes light engineering. I use this as an example, 1½" scale WAGR 'V' Class loco — 3.6" gauge = 5" gauge, 1½" scale say an English Black Five 4' 8½" gauge = 7¼" gauge but my guess is the 'V' Class would be a bigger finished loco.

I think some people have tunnel vision or get stuck in a time warp. Years ago did this same thing happen when people started to move on from 3 ½" gauge to 5" gauge.

People also forget lathes and milling machines, etc. were expensive, so the average person could only afford a small lathe or mill and with small machinery you can only build a small loco or what ever takes your fancy — as long as it was small. In the last 25 years or so due to Japanese then Tiawanese and now Chinese machine makers (next is India) you can buy a reasonably large lathe with all the gear and a milling machine that will handle most 7¼" gauge and 2 to 3" scale, for a very reasonable price. When you consider the quality of the machines, they may not be Colchester or Bridgeport standard, but considering what they are, they're not bad. I personally am not into large industrial type loco's like what Keith Watson and co may produce, but they are very functional and a lot of railways in Australia including Castledare in Perth rely on these locos and the same applies whether it is 7¼ or 5 " as there is as many of these type of loco's on 5" gauge as well as 7¼". They may not look the best but most of them go like the clappers and are in the skill level of a lot of people who may not think they can build something more like a "proper steam locomotive" if I can use this term.

I am building a 1½ " scale Union Pacific *Challenger* 4-6-6-4, which most people would consider a very large loco, which in some lays is true. I consider it a long loco at 15' 4" finished length, but no bigger than other locos of similar scale in height and width. People call me a rivet counter, I make all my nuts and bolts in various shapes and sizes with stainless steel right down to 12BA which is pretty small and takes a lot of care to do. So people would say if I make 12BA stainless steel nuts and bolts I am a model engineer, but as soon as I put that 12 BA bolt on my 1½" scale *Challenger* which has very fine detail then I am doing light engineering. What a load of rubbish!

People please open your eyes and be a little more flexible on your views. We are all doing basically the same thing and for the same reasons. Whether it is 3½ " or 7¼ " gauge for whatever reason you choose to build in 3½" or 7¼" it is all the same. It just varies in size. Whether you like the style or scale of an item is irrelevant and what you or I like may be totally different to someone else. People in a lot of cases do not know the reasons a person built that particular item. In a lot of cases it relates to the size of the railway in their area. It would be a very boring world if people did what minorities of tunnel vision people reckon they should build.

Yes in a lot of cases different gauges do not mix, especially if your track starts to get quite large for obvious reasons. That is up to the individual clubs and they have to assess where they want to head in the future.

It is obvious to me where light engineering starts , when you venture past 7¼" gauge, because as far as I can see it would be almost impossible for the average person to machine something of larger scale and be able to afford to build and run these items. Even in the U.S they haven't really ventured past this point and if any one was going to then the Americans would. That is why 7¼" and lower = model engineering above this = light engineering ,even then I think this is shaky ground. If it is a model of something isn't that model engineering!

If you really want me to get fired up, just start me on the 50-L boiler code.

People enjoy your chosen hobby and for the minority of people who want to be school teachers and dot the "i's" and cross the "t's", open your eyes and stop trying to stuff it up for everybody. There is enough regulation involved in our hobby now. People, things change with time — stop being as flexible as a paving brick and move with the times.

Chris Hollands

(Chris, my understanding was that the criticsm was aimed at the large industrial types you referred to, not 1½" scale types like your Challenger *... Ed.)*

7¼" and 5" gauge open forum

So the controversy is still raging on! Why can't people within the so called 'hobby' just simply enjoy their membership in the

world wide fraternity of model miniature scale, 'Disneyland'. Call it what you will, but the bottom line and end word is trains! I am glad that our Editor sees in his greater vision that model engineering encompasses a huge range of subjects that deserves to be seen, enjoyed and most of all, gives the best satisfaction to the creator or owner of any item to share with all of us within our vast fraternity.

All those within the fraternity, more particularly in our so called 'hobby' of model or miniature railways should really 'shut up', their continual whining and carrying on about whether 5" or 7¼" is better or best! Why even 3½" is great to look at and enjoy. Also one must admire the smaller gauges and the 'mechanical mighty mice' that scurry across many a table world wide — again to the creators and owners of whatever it is, to their own enjoyment and satisfaction. I enjoy most of all, trains and anything associated with it. (I must admit however, I have a huge love of railway signals more than anything else.)

I would like to share with you why I have gone this way - down the railway line in a journey that commenced way back in 1955. Even before then, the Victorian Railways 'sparks', drivers knew me as a little red headed fella that stuck his head out of the 'Doggies' or the 'Taits' windows without fail, in the first window behind the drivers cabin on the Box Hill line, often leading to the instructions 'Hey Bluey, keep ya head in'. Why was I doing this? I just loved looking at the signals and reading their messages. Boy, am I really cross and lamenting the passing of open windows and 'natural' air conditioning these days - probably why I don't frequent riding the rails on the 12" to the foot scale these days. Being hearing impaired, as they say in these modern times, I am unable to be in the job I really love. Be it pulling levers in a signal box or at the throttle of a steamer or diesel, my lifetime happiness is being greatly fulfilled within our miniature railway fraternity. I graduated from my humble beginnings of looking out of train windows, being in a club that owned heaps of 'mechanical mice,' to my membership of two great clubs, Diamond Valley and Cobden to this day.

Diamond Valley is a single 7¼" gauge railway and proud of it. (A little secret, it was originally planned and allowances made to go to 10¼" gauge sometime in the future). The track at Cobden is 5" and 7¼" dual gauge. My experience at both of these clubs and heaps of other clubs I have visited leads me to ask, "What are the problems?" Lets go through them one at a time.

Size v Size — I feel it is everyone to their own wishes, not to be dictated to by others. Those of you who know me, I am one of many in a large club of people often called 'a fat old bastard!' Therefore I much prefer to own and drive a locomotive that I can sit on or inside, comfortably for hours and hours — so much is my love of driving large trains with lots of happy, smiling kids (and big kids) towed behind, again for my passengers in large, comfortable and safe sided carriages.

My, doesn't that statement open a can of worms. I re-iterate again — get off my back and enjoy the hobby that is essentially all about trains. Who cares about how many rivets are in a scale tender side wall? Who cares about how many 'thou-of-an-inch', a piston ring or shaft diameter is? Who cares about whether locomotives are made of fibreglass nose moulds or Victa mower blade discs fitted as a smoke box door. Model engineers do care about what they build and are justifiably proud of their finished product and so do all of us. However, if a fibreglass nose or a Victa mower blade disc will do the job just as well and model engineers have the common sense to see that it will work and save hours of time and labour — why on earth not? Many of these fine and well intentioned, so called model engineers, who build these beautiful fine scale or whatever scale (and that is meant in all sincerity to these guys) have a place within our fraternity. But, if you are like me, who has little or no equipment, time or the biggest factor, money - one has to do the best with what we have. We, who build "Disneyland" type locomotives and carriages, whether they be huge, large, medium or small, like a pizza, they are all enjoyable and also have a place in our fraternity. I can say from over 40 practical years of experience within the hobby of miniature railways, the kids and big kids who ride behind in my train, be it hauled by my huge 1 tonne and 80kgs Cobden Flyer, or much more modest fine scale *Oakstream*, Caribou steamer, they just don't give a damn how many rivets there are or whether it resembles exactly a D3, or a Tx or a 12 and 19 Class. All my passengers over the years have come up to me many times to tell me personally how much they enjoyed the ride and are more likely to ask me what is the motor or power source within and are usually quite astonished at how clever I was having a commonly known Holden 186 within.

Also many comment how much safer and comfortable they are in good sized 'sided' carriages. So I would like people to get off my back about me being 'big Disneyland type or have 'Victor Mower blade discs — it works! You are entitled to your opinion, but please don't denigrate those who don't have your expertise, as those who have the workhorses are more likely to bring the money and "bums in seats" in to your club to finance the expenses and privileges you enjoy at your own club site.

Size and Weight — Always a vexed question to answer anytime. It seems that many of the smaller, older clubs used rather small bar stock and widely spaced sleepers and thus are suffering the demise of too finely scaled railway lines with the onslaught of today's larger locomotives, particularly narrow gauge scale. Diamond Valley went through the whole gamut using ⅜" x ⅜" upgrading to 1" x ½" barstock, more because of vandalism rather than size or weight of many huge locos running around. They eventually used mostly second hand 14lb/yd true to type rail and are now in the process of replacing badly rusted and pre worn rail with brand new rail not all that much smaller than currently in use. Cobden used 1" x ½" barstock slotted, into 3" x 2" treated pine sleepers at 9" centres. This line has survived six years normal running plus two national conventions (calculated out at an extra 4 years per convention of normal Cobden running days crammed into 4 days) heaps of invitation runs, lots of specials (we ran 17 days straight last December) and we overheard comments stating that the track had 'bedded' even better than the 1997 Convention. Weight is no problem if your club has a good size rail, plenty of ballast and good, wide sleepers sensibly spaced apart.

What is interesting about Cobden is that we have very few 5" gauge locomotives and for months on end, no 5" gauge is to be seen on our running days — it is all 7¼" gauge. Speaks volumes about 5" being more hobbyist and 7¼" being more comfortable and practical in hauling our "bread and butter". Passengers pay the bills to allow those who are pure hobbyists, to enjoy their hobby. Once again, I re-iterate that the end words are 'love of trains'. So stop all this carrying on. Everyone of us have a place within our fraternity. We don't need to have separate gauges and Associations. We don't need people within our fraternity forcing their will over others about their pet hates or likes. We do need understanding and tolerance of all others within our fraternity as all of us contribute in one way or another many differences and variables that makes our hobby so exciting and diverse, remember to "love those trains".

Ron May

Cross-roads or double track?

Thank you for this opportunity for people to express their opinion about the model engineering genre through an open forum.

The model engineering genre has likely come to the cross-roads because of the lack of reference to historic elements and a preference of reference to contemporary elements. Nothing can progress without reference to the past.

For example model railway tracks, say between the 2½" gauge and the 7¼" gauge could be dichotomised between raised level track and ground level track. The 2½" gauge and the 3½" gauge, as the historic elements, could be regarded as for raised level track. The 5" gauge and the 7¼" gauge, as the contemporary elements, could be regarded as for ground level track.

There are not enough railway based model engineering club tracks around for a person to have an option, or choice, of track

types in the local vicinity so I think it should be the norm that club tracks be dichotomised with both raised track and ground track. This will be fair to all interested people and avoid the fashionable and parochial creep to larger gauges. What I am writing about, for example, is that a ground level, single gauge or multi gauge, track in a club setting, will not be successful as half of the people who would be interested in a raised track will obviously not participate in that club.

Why I raise the issue of a dichotomy above is that we human beings think by comparing and contrasting two things and it would be reasonable if model engineers could apply this to their modeling culture.

To prove my point I recently corresponded with the editor of the *Model Engineer* magazine in the UK about several model engineering issues including the issue of a dichotomy of prototypes for interested people to model. Maybe by coincidence or agreement that magazine is now publishing a model steam railway locomotive construction series with two Scottish railway prototypes as the subjects. This should allow interested people to compare and contrast the two prototypes and make a choice whether to model both prototypes or choose one of the prototypes to model.

I have done something for the historic elements I mention above. In recent times I have also tried to determine the number of live steam model railway locomotive construction series that have ever been published in all of the world's model engineering literature. I estimate there have been about 200 of these through time.

My concern is that these may be lost to history through time and I had asked the opinion of some model engineering people whether they thought a data base of references for these would be a reasonable thing. Non published live steam model railway locomotive construction series, plans, and the like, together with the source of these, could also be added to this data base. All thought it would be a reasonable thing to have available but nobody has the resources nor time to do so. Any interested takers for this project ?

At p 58 of *AME* Issue 97 Peter Read wrote that he been convinced not to build a model Garratt as his first project. I am sure there are people around who would have supported Peter building a model Garratt first. So, perhaps if he can tell readers of AME what his original intentions were, and which Garratt he was intending to model, he will likely find people that support his original position.

Hoping the above is of interest and enhances the model engineering genre.

James Tennant

(Whilst James has aired some interesting thoughts, he has digressed somewhat from the main topics of contention.

Thankyou to those people who have taken the time to contribute to this debate so far — letters are still arriving as this issue goes to press. As expected from the outset, there are obviously going to be diverse opinions and some of them are rather strongly held. It is interesting to see the various attitudes come through and to see how individuals feel about the large versus small situation, which really is what it boils down to. Whilst people have been expressing their feelings, there seems to be little coming through by way of practical suggestions or thoughts on how to overcome this "divide" which seems to have developed. Does it mean the best way to go would be separate tracks, as at Lake Macquarie, separate runnning days (or rosters) or separate clubs? Perhaps it simply all comes down to being more tolerant of each other's interests and each other's approach to what a miniature railway should be.

The forum will continue in the next issue ... Ed.)

Here's a little something a bit lighter —

Morris was applying for a job as a flagman/signsl operator on the railway.
The chief engineer was conducting the interview.
"What would you do if the Northern Express was heading north on Track 1 and the Southern Limited was heading south on Track 1?"
Morris quickly answered ..... "Well, I'd call my brother."
The chief engineer just sat there for a second. "WHY would you call your brother???"
"He's never seen a train wreck before."

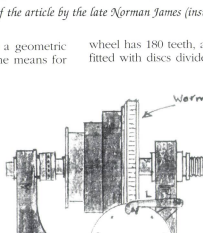
Cutting Wheels With Prime Numbers of Teeth

A method of generating gear wheels written by Richard Inwards in 1900

Supplied by Don Bladier from a handwritten copy of the article by the late Norman James (instrument maker at Melbourne Observatory)

Requiring a number of small toothed wheels for a geometric curve arrangement, it was necessary to find some means for cutting those which had numbers of teeth only divisible by unity — prime numbers — the others presenting no particular difficulty. It must be admitted in the beginning that there is no way of cutting a wheel, say, of 37 teeth with precise theoretical accuracy; but the method I am about to describe will be so near, that all practical purposes are answered.

My lathe has a worm wheel and tangent screw attached to the headstock in the usual way. The worm wheel has 180 teeth, and the spindle of the tangent screw can be fitted with discs divided in any desired way, and perforated with holes for the reception of a pin which is held in place by a notched lever coming down on it, as show in **Fig. 1**.



The essential parts for the purpose of cutting prime wheels are shown in **Fig. 2**, where **A** represents a gun-metal wheel fixed on the end of the tangent screw and perforated with 100 equidistant holes. B is a piece of metal fitted with 2 pins **C** and **D** which are exactly the distance of 10 holes apart. Any other number might be taken as these pins are only to hold the

piece B to the division plate **A**. It may be mentioned that the pin **C** projects outwards so as to form a handle, and it is also longer on the other side, so as to facilitate adjustment to the long tapered end being placed in the desired hole, when the shorter pin **D** easily slips into its own place.

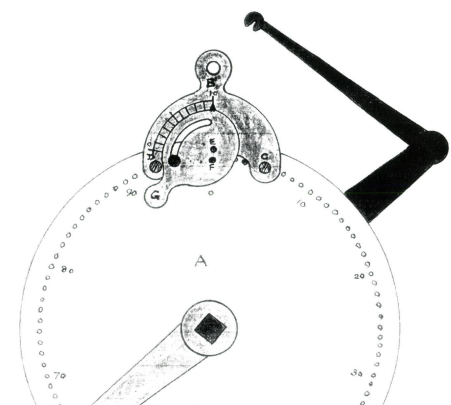
G is a quadrant piece, slotted as shown, and capable of being fixed in any position by the screw which passes through it. This quadrant piece rotates on **F**, which is a small pin attached to this piece **B**, but not projecting beyond the front of **G**. It falls exactly over the middle hole between **C** and **D**. **E** is a pin projecting outwards from the face of the attachment, and this pin engages in the notch of the lever **L** when the latter is let down on it.

The distance between **E** and **F** is exactly one division of the row of dots, so that when the pointer on **G** stands at 10, it is practically over one hole; but when the pointer stands at 0 on the scale, it is over the one before. At intermediate points on the scale it corresponds to tenths of a division, and as it moves eccentrically round **F**, it practically divides the space between two adjacent holes into 10 equal parts.

The scale, which is made without difficulty, is so divided that it corresponds to equal steps of **E**, as measure on the line of holes. These steps correspond to 1/18000th of the circumference of a wheel fixed between centres in the usual way for cutting in the lathe.

In cutting a wheel of 6" diameter, the greatest error which could occur in the setting would not amount to the 1/10000th of an inch — a quantity probably less than the unavoidable errors caused by of tools, temperature and other causes.

The management of apparatus requires the undivided attention of the operator, and a table for each wheel to be cut has to be calculated. For instance, in cutting a wheel of 37 teeth, the first cut will, of course be at zero, the second will be at 4.864 — a number obtained by dividing 180, the teeth in the worm wheel, by 37, the teeth in the tangent screw handle. The next two figures 86, means that the pin **C** is to be set in hole number 86 on **A**; and the last figure, 4, is to be set on the small quadrant scale. But in dividing 180 by 37 there is a remainder of 32. This has to be distributed as equally as possible over the 37 teeth, i.e. .001 is added to each number of the table except five, which five are to be separated as equally as possible.



If still greater accuracy is required, make the piece **G** large enough to admit of 20 divisions instead of 10. I have cut many prime number wheels by this method, and they run as smoothly as those with more tractable divisions. I may mention that this arrangement for subdividing the disc on the end of the tangent – the whole lathe head is converted into a micrometer of great accuracy and with the addition of a screw piece attached to the lathe nose, are of, say 20 threads to the inch, working in a nut properly restrained from going round, a quantity so small as a half millionth of an inch could be theoretically measured.

For such ultra-refinement the piece **L** must be surplanted by a distant moving radially to **A**.

Original article by Richard Inwards appeared in English Mechanic, February 2, 1900, Vol. LXX-LXXI, Page 556

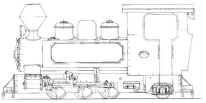
Prime Multiples $120/31 = 3.870967$

Tooth	Turns	+	Tooth	Turns	+
1		zero	17	61	.935472
2	3	.870967	18	65	.806439
3	7	.741934	19	69	.377406
4	11	.612901	20	73	.548373
5	15	.483868	21	77	.419340
6	19	.354835	22	81	.290307
7	23	.225802	23	85	.161274
8	27	.096769	24	89	.032241
9	30	.967736	25	92	.903208
10	34	.838703	26	96	.774175
11	38	.709670	27	100	.645142
12	42	.580637	28	104	.516109
13	46	.451604	29	108	.387076
14	50	.322571	30	112	.258043
15	54	.193538	31	116	.129010
16	58	.064505		119	.999977

A bit of trivia courtesy of Geoff Payne:—

When the railways were being operated in the 1800's, it was a full time paid job for someone to ride a company push bike around all of the houses of the crews of trains and to knock on the doors, no later than one hour before the train was scheduled to begin it's work for the day. The general local term for this job was that the person was known as a Knocker Upper. Anyway in some circumstances, when the trains crews were off to work the Knocker Upper used to slip into the vacated bed of one or more of the men. This was well obvious to all of the local town folk as the push bike was usually left leaning up against the wall of the particular house in favour. Consequently, if a woman was seen to be pregnant she was said to be 'knocked up' and this is where the generally known slang term came from.

Bunyip



A Bundaberg Fowler 0-6-2T in 7¼" gauge — part 20

by Ian Smith

Drawings and photos by the author unless credited otherwise

Whistle

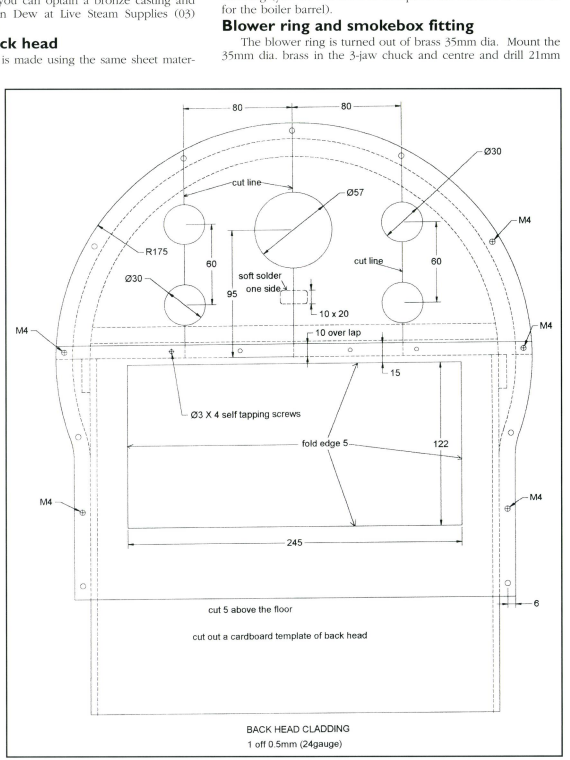
Referring back to the last instalment, if you do not feel you can fabricate the whistle body you can optain a bronze casting and brass tube for it from John Dew at Live Steam Supplies (03) 97239722 (usual disclamer)

Cladding on the back head

The backhead cladding is made using the same sheet material as you used to clad the boiler. It is made in two main pieces top and bottom, and the top is then cut into four pieces. Mark out the five holes for the water gauges and regulator on thick card and cut the holes, then cut into four pieces through the centre of the holes, assemble on the back head and tape together. Mark the outside (175mm radius). Take off the template off the back head and cut the outside shape. Mark out from the template on the cladding material then come in 6mm from the outside and mark out the bolting holes — three holes are on the cut lines, the one bolt holds the two pieces. Drill the 4mm holes and the four 30mm dia. and 57mm dia. holes then cut into four pieces through the centre line of the holes. Assemble and tape in position and drill and tap the M4 holes, leaving the two bottom holes till the bottom section is cut and fitted before drilling them. On one of the two regulator pieces solder on a small tag on the inside — it will help to support the two pieces when assembled. Do the same for the bottom section. Make a template and cut out to shape. Where the cladding goes around the fire door frame, fold the four edges over 5mm inwards to stiffen the cladding up. Drill the M4 holes and the holes to take 3mm diameter self tapping screws. Disassemble and use the left over blanket and pack behind the cladding (you do not need to compress the blanket as much as for the boiler barrel).

Blower ring and smokebox fitting

The blower ring is turned out of brass 35mm dia. Mount the 35mm dia. brass in the 3-jaw chuck and centre and drill 21mm



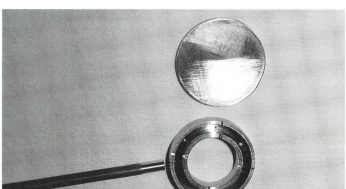


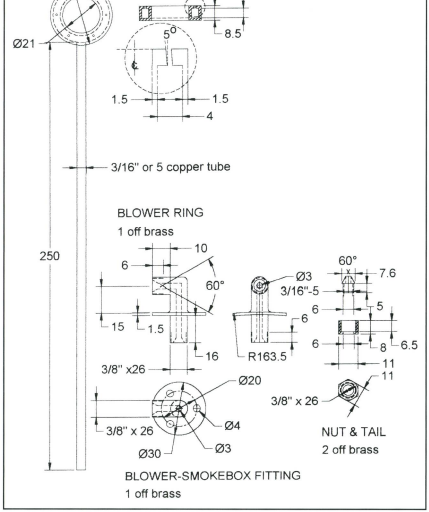
Photo 1

Photo 2

dia. or bore to size a neat fit on the top of the blast pipe. With a trepanning tool (a small parting tool) 4mm wide, set the tool 1.5mm in from the outside diameter and feed in with the compound 5.5mm deep, and part off 7mm wide. Reverse in the chuck and with a pointed tool mark a line in the centre of the ring, mark out the six holes with dividers and lightly centre pop the marks. With a swivel drill vice set to 5° drill a 1mm diameter hole — when drilling the first hole the top of the hole taps into the centre of the ring, then rotate the ring around to drill the other holes.

Cut a brass disk about 40mm dia. and 1.5mm thick — do not cut the 21mm hole in the centre. Before silver soldering together drill a 5/16" or 5mm diameter hole in the side to take the copper feed pipe about 250mm long, but soften the pipe before it is soldered in. File four nicks across the bottom of the blower ring to make sure the solder will flow through to seal inside the ring. **Photo 1** shows it at this stage. Clean up all faces and the end of the blower pipe, flux up all parts but do not let the solder get into the end of the pipe as it can seal the end of the pipe. Heat the whole assembly up and when the flux turns to clear apply the silver solder inside and outside the ring (**Photo 2**).

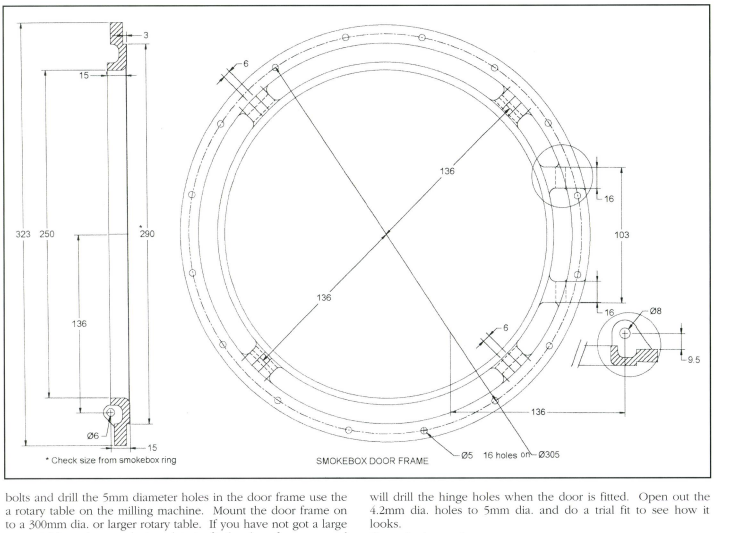
Mount the assembly in the 3-jaw chuck to turn the outside and the inside hole. Carefully bend the copper pipe in the opposite direction to what the chuck is travelling as you do not want it to come unraveled when the lathe is running — also don't run the lathe too fast as it can have the same effect.



The smokebox blower fitting is turned from brass. The main body can be made in two pieces and silver soldered together when the bolting washer is soldered to it. The washer is cut from 1.5mm thick brass 30mm diameter with a 9.5mm dia. hole in the centre. Mark out for the three 4mm dia. holes and drill. The fitting can be turned out of 9.5mm dia. brass using a 3/8" x 26 tpi die held in the tail stock die holder and cut 6mm long. Centre drill until the 60° measures 6mm dia. and drill 3mm dia. 35mm deep and part off 37.5mm long. Machine up the short piece of the fitting but do not part off. Make a drill block out of some scrap material and drill a 9.5mm dia. hole through it and another 15mm from the front edge and then drill 9.5mm through the 9.5mm long hole so that when the top fitting is fitted in the long hole and the 9.5mm diameter drilled through, it will give the right radius to silver solder together. Set up the washer 16mm up from the long piece and with the holes in the correct position, solder together. The position of the fitting on the smokebox is on the centre line of the chimney and 130mm from the centre line of the top of the smokebox. On the left-hand side drill a 9.5mm dia. hole. Before drilling and tapping the three M4 holes face the top of the fitting towards the cab. The radius of the smokebox over 30mm is very small when it is bolted down and it will follow the shape of the smokbox. The nut and tail need no explantion.

Smokebox door frame

The door frame is an iron casting. Setup in the 4-jaw chuck holding on the inside hole and turn the outside diameter to 233mm and face the back, then machine the 3mm wide step to 290mm dia. That is the location of the door frame in the smokebox — check the measurement from the smokebox ring. Hold the frame by the outside diameter and set it up to run true, bore the inside to 250mm dia. and face the smokebox door sealing face, but be careful when the cut gets near the eye bolt pivot bosses. To machine the hinges and slots for the eye-



bolts and drill the 5mm diameter holes in the door frame use the a rotary table on the milling machine. Mount the door frame on to a 300mm dia. or larger rotary table. If you have not got a large rotary table make an adapter plate to fit the door frame on and bolt it to the rotary table and mount the door frame to it. Set the frame concentric to the rotary table. Find the centre of the rotary table and "zero" the cross slide and longitudinal travel dials, rotate the table till the hinge flanges are parallel to the table travel and "zero" the dial on the rotary table. Move the cross travel in 51.5mm plus half of the diameter of the end mill and take a cut off the hinge flange and then repeat the other way. You should have a measurement of 103mm move the cutter on the other side of the flange and machine to 16mm wide on both flanges. Change the cutter to a 6mm slot drill to machine the slots for the eyebolts. Set the milling table travel back to the "zero" which will put the cutter on the centre line, rotate the table 45° and mill the slot. Take the cutter down 6.5mm deep from the sealing face of the door but do not cut into the sealing face. Rotate the frame 90° and repeat the same process on the other three.

Set the rotary table back to "zero" and rotate it 11.25° and move the milling table travel 152.5mm and centre and drill 4.2mm diameter (M5 tapping hole), rotate the rotary table 22.5° and repeat on the fifteen other holes. The frame can be removed from the rotary table BUT DO NOT SHIFT OR ALTER THE MILL AS YOU WILL NEeD THE SAME ROTARY TABLE AND SETTING FOR THE DOOR.

Set the frame up on an angle plate to line up the slots square to the drill. Put a piece of 6mm wide strip into two opposite slots, turn the frame vertically till the 6mm strip is square to the drill table, mark out the 6mm diameter hole 136mm from the centre and level with the sealing face. Drill 6mm dia., mark out the other side and drill, put the 6mm wide strip into the other two slots and repeat. Set the door frame up in the smokebox opening and set the hinge up parallel to the front buffer beam. Clamp with some small G clamps through the opening and drill the 4.2mm dia. holes 10mm deep, remove frame and tap M5. You will drill the hinge holes when the door is fitted. Open out the 4.2mm dia. holes to 5mm dia. and do a trial fit to see how it looks.

Smokebox door

Set up in the 4-jaw chuck, holding by the four clamping lugs. Face the sealing face, bring it to about 8mm from the four clamping lugs but not under 8mm as they might sit on the eye bolt lugs and not seal. Set up on the rotary table the same way as the door frame and mill the inside of the hinge lugs to a good fit on the door frame. You will have to use a small diameter end mill to get into the corner — if not finally fit with a file. Machine the hinge lugs to 16mm wide, rotate the door 45° and machine as if cutting the slots in the door frame — the centre of the slot should be 136mm from the centre. Rotate 90° and finish milling the rest of the slots, rotate the door around to the door handle bosses and take a clean up cut across them. Set the door hinges back parallel to the table travel and come out 88mm from the centre of the door and 19mm either side of centre and centre and drill 6mm diameter. Remove from the rotary table and turn up the four eyebolts to the drawing the same way as you did for the spring eyebolts. Turn up the four eye bolt pins and washers out of 10mm dia. silver steel to the drawing, fit and mark where the 1.6mm dia. split pin is to be drilled and drill all four pins. To make the door catch handles, put a 13mm dia. piece of MS up in the lathe and centre and drill 5mm dia. x 12mm deep and chamfer the hole to about 6.5mm dia. and part off 10mm wide — it will make the nut part off four. Put each one up in the chuck and chamfer the 4.2mm dia. hole the same as the front, and using the tail stock tap M6. Drill a 6.5mm hole in the centre of the 10mm x 5mm deep. Don't worry if it breaks through into the M6 as the handle is silver soldered in. Turn up the four handles 30mm long, round of one end, set up and silver solder together. When they have cooled off run the M6 tap through the nut, hold the nut in the vice and using a piece of tube with a 6.5mm or 7mm dia. bore, bend the handle to the drawing. Clean up and polish and remove any trace of the flux as it will rust all your good work.

Fit the eyebolts and pins to the doorframe. Clamp the door to the door frame using the eye bolts and door catch handles and make sure the door and the door frame are sealed; if not file to fit. Mark out the hinge pin hole 136mm from the centre and 9.5mm from the sealing face, clamp to an angle plate and set the hinge lugs up parallel to the drill table and drill 8mm diameter. The drill will cut a bit over size and will give a little clearance for the door to seal and not bind on the pin. Be careful when you start to drill the bottom lugs that the drill does not wander. Make the silver steel pin to the drawing and mark the split pin hole and drill 2.5mm dia. There is no washer fitted to the hinge pin. Try the door with the pin in and if it will not open up file the hinge lugs until it does. The door handle is made out of 8mm dia. MS x 80mm long. Turn both ends to 6mm dia. x 19mm long and thread M6 x 10mm long. To bend to shape cut a piece of 10mm thick MS to the inside measurement of the handle and radius two corners 4mm, set the handle up with the block in the centre and heat up were the bend has to be and with a soft hammer bend at 90°. Repeat for the other side and fit the door handle to the door. Bolt the doorframe into the smokebox.

Chimney

Set the chimney casting up in the 4-jaw chuck and turn the base of the chimney to 154mm diameter (**Photo 3**). Reverse in the lathe and hold in a 3-jaw chuck, fit a pipe centre in the other end and turn the outside diameter to 82.5mm dia. x 120mm long

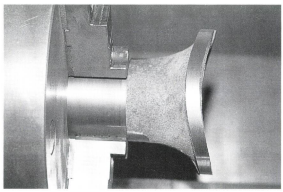
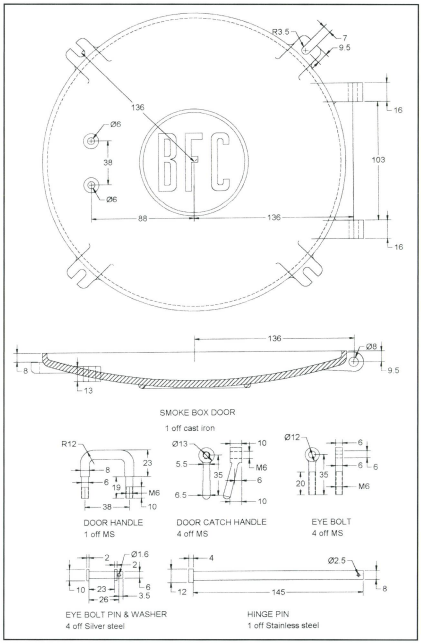
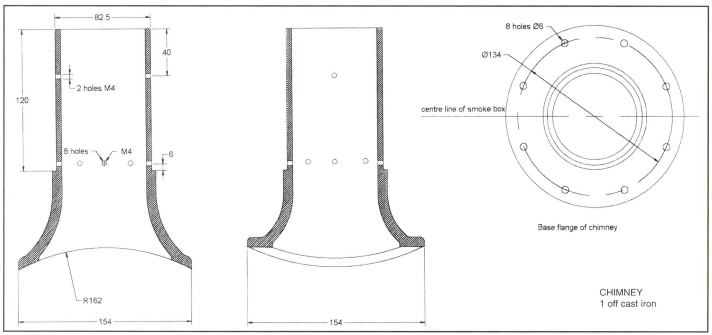


Photo 3





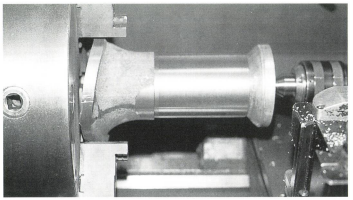


Photo 4

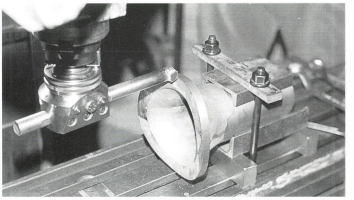
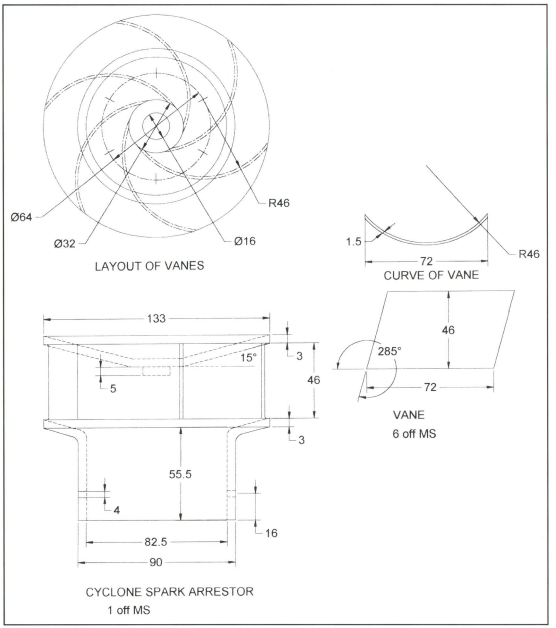


Photo 5

(**Photo 4**) and chamfer the top of the chimney and the step. Reverse in the 3-jaw chuck and take a clean up cut across the base because the end might not be square. Set up the chimney on a piece of 37mm x 38mm x 120mm long channel that has had a cut taken off the two sides of the channel so the sides are parallel to the bottom of the channel — make two off. Clamp the chimney in between the two channels and set it parallel to the table travel and set the chimney base radius square to the milling table. Set the milling head up in the centre of the chimney base and put a boring head up in the milling head with the boring bar set to 162mm radius (**Photo 5**). One way to set the radius is to roughly set the bar with a rule then set a square up on the cutting edge of the boring bar and rotate 180° and set another and measure between the two and adjust to size. To set the cut turn the boring bar by hand and set it up until it just touches the chimney and set a light cut and feed it down the base. Keep taking small cuts moving the milling table in till the hole face has cleaned up. Mark out the eight holes to the drawing 22.5° either side of centre by hand using jennies and dividers and using the off cut of the boiler firebox as a jig to hold the chimney drill 6mm diameter. To set the chimney up in the right place turn up a setup bar to a good fit into the blast pipe and long enough to come through the chimney and set the chimney concentric to it. Scribe the outside of the chimney base on the smokebox and make up a 6mm dia. centre punch and centre punch one hole. Remove the chimney and bar, cover the blast pipe so nothing will go down it when drilling the 6mm hole, drill the 6mm diameter hole and bolt the chimney to the smokebox and put in the setup bar and recheck that it is in the centre. If so, using the chimney as the drilling jig, drill the rest of the eight holes. Before removing the chimney, using a number punch, stamp both chimney and smokebox so it will go back in the right place when removed. The rest of the holes will be drilled from the mating pieces.

Cyclone spark arrestor

Cut out two discs of 3mm thick plate 138mm diameter and mark a 25mm dia. circle in the centre of the two discs. Cut a piece of tube 100mm dia. x 12mm long and set the tube up in the



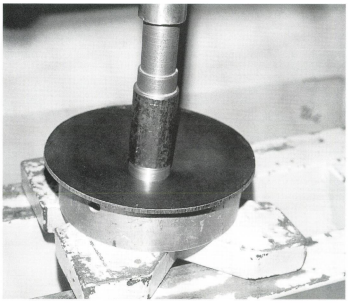


Photo 6

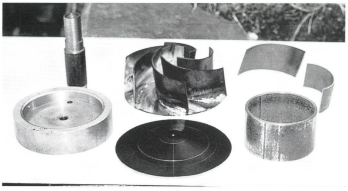


Photo 7

press with the tube sitting on a flat plate. Set the tube central to the press ram. Sit the 138mm dia. plate central on the tube with the 25mm dia. circle up and with a 25mm dia. pin set on the circle, press the pin down till it hits hard on the flat plate (**Photo 6**). It will give you the 15° angle and a flat bottom. Repeat on the other disc. Cut a piece of 90mm dia. pipe x 80mm ID, setup one disc central on the tube and arc weld. Now set the assembly up in the lathe and bore the centre out of the disc and tube to 82.5mm to a sliding fit on the chimney. Mark out the centre of the disc and centre pop. With the dividers scribe a 32mm dia. circle, reset to 32mm and scribe a 64mm diameter circle, mark the

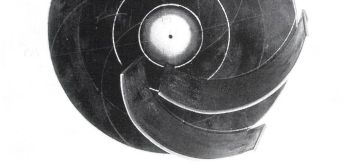


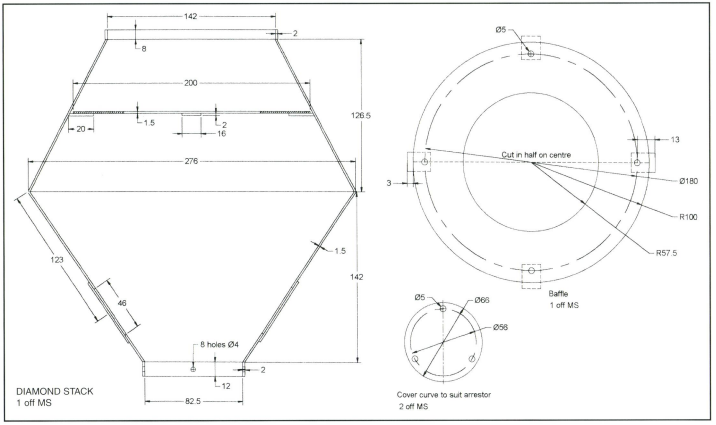
Photo 8

Photo 9

circle into six equal spaces and centre pop the marks on the circle. Reset the dividers to 46mm and using the six centre pops, mark the six positions for the vanes. Guillotine a strip 46mm wide off a 1.5mm thick sheet then with a protractor set to 15°, scribe a line across the strip and cut off along the line. Move along 75mm and mark again, guillotine off on the line and using that piece, mark off and cut another five pieces. Using a set of rollers, set to give a 46mm radius, roll the vanes. Set the vane up to go through the rolls on 15° angle running the vane through the rolls both ways. Set one vane up on the line, one end on the 32mm dia. circle and using manganese bronze rod, braze the vane on both sides. **Photo 7** shows the components you should have by this stage, the two on the right being the jigs for pressing. Repeat on all six vanes (**Photos 8 and 9**). When cool sit the brazed assembly on to the bottom half and set central and braze to the bottom piece. When cold setup in the 3-jaw chuck and centre and drill a 6mm dia. hole and then using a revolving centre in the 6mm dia. hole to support the spark arrestor, turn the outside diameter to 133mm dia. Using a piece of 16mm dia. MS turn a step 6mm dia. x 6mm long and part off the 16mm dia. 5mm long. Put it in the 6mm dia. hole on the inside and tack weld the spigot that comes through the disc. Mark out the two bolting holes and drill 3.3mm dia. Fit the arrestor to the chimney with the two holes facing at right angles to the smokebox direction, drill 3.3mm dia. and stamp the arrestor and chimney before removing. Remove arrestor and tap M4, open out the 3.3mm dia. holes to 4mm dia. in the arrestor.

Diamond stack spark arrestor

The diamond stack is cut from 1.5mm sheet steel. Generate the shape of the cones on a piece of cardboard and cut out. Mark out the shape of the top and bottom halves of the cones using the cardboard templates and cut out and roll the cones to shape. Weld the seam using small runs trying not to get too much heat into it as it will want to buckle the cone. Clean off the excess weld and re-roll the cones. Starting from one point on the centre seam of the diamond stack make a tack about every 20mm (no more) around the centre until it is all tacked. At times it will seem as if it will not fit but it will. Now put another tack in the centre of the first tacks, then take care and weld up the spacing left. Roll up two rings for the top and bottom of the stack — they are made out of 2mm thick sheet. Guillotine off one strip 8mm wide and roll to 142mm ID and one 12mm wide to 82.5mm ID. Do not make it a sloppy fit on the chimney as the diamond stack might sit at an angle to the chimney. Tack weld as before for the cones. Before welding the bottom ring on, mark out the eight 4mm diameter holes in the centre of the ring and drill 3.3mm diameter, slide the ring on the chimney and set the holes up as for the



chimney drawing and drill 3.3mm diameter. Stamp both ring and chimney, remove and tap M4 and open out the 3.3mm diameter holes to 4mm diameter. Now it can be welded to the stack. Clean up all welds and trial fit to chimney. Before removing from the chimney mark the two sides for the clean out holes and access to the two bolts in the cyclone, 123mm down from the centre seam. Centre pop and remove from chimney and use a hole saw to cut the 46mm dia. holes in the sides. Mark out the covers 66mm dia. and the three equally spaced 5mm dia. holes on 56mm circle, curve the covers to the chape of the arrestor with one 5mm dia. hole on the centre line, clamp the cover to the stack centrally over the 46mm diameter opening and drill 5mm. Fit three M5 x 10mm long bolts through the holes and bolt the two together. The heads of the bolts are welded to the inside of the stack because you will not be able to get a spanner inside to tighten them up. The holes will need to be filed out a bit to allow the cover plate to be removed. Cutout the baffle plate to size and drill the four 5mm dia. holes on 180mm dia., then guillotine through the centre of two of the 5mm dia. holes or you will not be able to assemble. Cut four mounting plates 16mm wide x 20mm long x 1.6mm thick and drill a 5mm hole in the centre of the 16mm and in 13mm from one end and weld a M5 nut to one side. Assemble inside the stack with M5 x 10mm long and washers. Turn the stack upside down on the welding table and set the baffle up level and weld through the bottom or through the two covers plates in place. Paint the inside of the diamond stack, cyclone spark arrestor, and baffle with Pot Belly black paint. When dry fit the diamond stack to the chimney and then fit the cyclone on the chimney and bolt with M5 bolts that do not stick out inside the chimney, the same as for the diamond stack. Bolt in the baffle plate — you will need to disassemble at different times to clean the cyclone spark arrestor. The chimney can be bolted to the smokbox if it is not already bolted up.

To be continued ...

The appearance of the diamond stackcan be seen in this 1998 view of railway author David Burke driving Bunyip *on the Berry Railway*

Bunyip Numbering

I have had many people ask me about the significance of number on the back of my *Bunyip* driving tender — was it the builder's number of the full size Fowler locomotive? No, the number 9603 tells when it was finished and received its boiler certificate. The first two digits, 96, are for the year completed and the next two, 03, tell it was the third one built.

So far there are

9301	*Tom Thumb*	Len Cottrel (DVR)
9302	*Joyce*	Diamond Valley Railway
9603	*Bunyip*	Ian Smith (Canberra SMEE)
9614	*Kaye-C*	Graeme & Kaye Clarke

If builders of *Bunyip* locomotives would like to carry on the numbering I will keep a register of all finished *Bunyips* and issue them with the next set of numbers.

Good Steaming!

Ian Smith

Letter Box

Experienced or professional

Sir,

Thanks to Karl Hampel for putting pen to paper regarding "T" section rail and plastic sleepers (issue 96). The article was well written and illustrated. However his final paragraph does a great injustice to his article.

Yes there are professional engineers, technical officers and railway folk amongst us, me included, but model engineering is one of the last great bastions where you can learn and build as you go from club members to magazines like AME.

It is the "T" section rail and plastic sleepers that point out his and his clubs innovation and willingness to give it a go. The point here is a solution to a problem did not come from a "qualified professional" person but some one whose university is that of the "unofficial Model Engineering University".

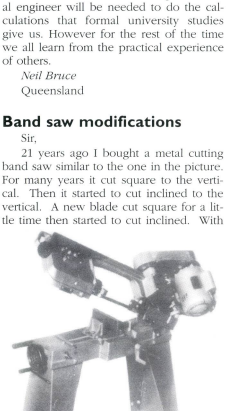
There will be times when a professional engineer will be needed to do the calculations that formal university studies give us. However for the rest of the time we all learn from the practical experience of others.

Neil Bruce
Queensland

Band saw modifications

Sir,

21 years ago I bought a metal cutting band saw similar to the one in the picture. For many years it cut square to the vertical. Then it started to cut inclined to the vertical. A new blade cut square for a little time then started to cut inclined. With use, the top flange of the soft cast iron wheels have worn away, allowing the blade to move up the wheel and removing the tooth set due to blade tension. The problem appears to be solved by beveling the edge of the cast iron wheels where the teeth touch. A bevel can be easily filed onto the cast iron driving wheel by removing the blade, switching on the motor and holding a file at an angle to the offending corner. I took the idle wheel off and filed the corner off in the lathe, I was not game to file it in the band saw with the blade on and running.



Another modification I made was to move the fixed jaw to within about 1mm of the blade (instead of the original 10mm gap). This makes setting up much quicker. This was achieved by drilling new holes in the fixed jaw — angle cuts require the fixed jaw to be relocated in the original holes. I also fitted a steel oven baking tray (the one with a wide flange) on slides between the legs to catch the shavings and job off-cut.

For those who have one of these band saws, check the oil in the gearbox regularly — it will run better with less wear with oil in the gear box. The brass worm wheel in my unit is about 90% worn away, possibly due to lack of oil. Some time soon, I will have to learn how to cut another brass worm wheel. I have now installed a clear window in the gear box cover to remind me there are moving parts inside.

Alan Craggs
New South Wales

A warning when grinding

Sir,

The article from Dennis Dalla-Vicenza, Vancouver Island ME, warning about the danger of aluminium dust mixed with iron dust reminded me of a frightening experience I had some years ago.

I was repairing the aluminium water pump on an old Rover car and was melting some of what I thought was aluminium in a steel lead pot to make a casting to machine. The metal was heated without trouble, however, when I began to pour and the film of scum on top of the molten metal broke, exposing the bright liquid, there was a pyrotechnical display which engraved itself on my mind as well as the vice and concrete floor.

I was only able to cope with it by picking the lot up with a spade and throwing it outside on to the grass where it gradually burnt out. I did not investigate the cause, however, as the simp metal as I think, a broken up VW engine sump or crank case and may have contained some magnesium. A reader with knowledge of metallurgy may enlighten us.

Ignorance is not always bliss.

Ken Gifford
New South Wales

Sir,

Thanks to those who brought this to our attention. The chemistry explanation is quite plausable and in fact this probably explains a smaller (thankfully) and similar event in my home workshop.

As it happened I had what I thought was a small flash go off when grinding some time ago. What bemused me was the smell afterwards. I could not identify the smell but I said to myself "I know that smell" and tucked the event away in my mind as one of those mysteries that may be solved someday.

As a technical officer with Queensland Rail (all be it in the signals design office) I am often out trackside and come across "Thermite" welding. The article put a name to a smell. And yes the two metals I grind the most on my linishing belt grinder are aluminium and iron/steel. Hence I decided to well and truly clean up the metal dust particles around my grinding station and I am now researching dust extraction for same.

I also remember seeing an ABC documentary on the Hindenburg in which it said that the reflective paint was what caused the fire not the hydrogen. This paint as made up of an aluminium iron oxide compound which was described in the show as "rocket fuel".

I also recall a book I borrowed on workshop designs that points out that if you are using PVC pipe as part of your dust extraction system you should run an exposed earth wire inside it and earth it preferably to the metal of the extraction fan (which should be earthed too) otherwise a build up of static electricity could help ignite any dust. The book suggested that galvanised downpipe is an affordable alternative which is easily earthed.

Neil Bruce
Queensland

Letterbox Contributions

You are welcome to send letters by mail to:

PO Box 21, Higgins, ACT, 2615 or
fax to: (02) 6254 1641 or
e-mail to: **amemag@bigpond.com**.

As far as possible, AME is an open forum for all members of our hobby. Therefore, all expressions of fact or opinion as long as they are not libellous will be considered for publication.

Please **type or clearly print** your letters, as script is often difficult to interpret.

List of Surviving Australasian Garratts

Australian Standard Garratt (Commonwealth Land Transport Board):
CLTB G class. 4-8-2+2-8-4. (1067 mm gauge).
CLTB 33
(G33) Newport c/n 571N 1945 APC no 3 ARHS Melbourne.

New South Wales (Government):
AD60 class. 4-8-4+4-8-4. (1435 mm gauge).
6029 BP c/n 7531 1952 ARHS Canberra
6039 BP c/n 7541 1952 Dorrigo.
6040 BP c/n 7542 1952 RTM Thirlmere.
6042 BP c/n 7544 1952 ++2nd 6042. Forbes.
Possibly 6021 BP c/n 7493 1952.

New Zealand (Mainline Steam Trust): Also see notes below.
SAR GMAM class. 4-8-2+2-8-4. (1067 mm gauge).
4083 BP c/n 7681 1956 Possibly composite of 4083 and 4088
BP c/n 7754 1956.

Queensland (Government):
Beyer Garratt class. 4-8-2+2-8-4. (1067 mm gauge).
1009 BP c/n 7349 1951 QR Ipswich.

South Australia (Government):
400 class. 4-8-2+2-8-4. (1067 mm gauge).
402 FB c/n 2975 1953
BP c/n 7624 1953ZZR Lithgow.
40 FB c/n 2982 1953
BP c/n 7631 1953 Port Dock Railway Museum.

Victoria (Government):
G class. 2-6-0+0-6-2. (762 mm gauge).
G42 BP c/n 6268 1926 Puffing Billy Preservation Society.

Victoria (Australian Portland Cement):
Numbered 2-6-0+0-6-2. CLTB G class 4-8-2-8-4. (1067 mm gauge).
No 2 BP c/n 6935 1939 Puffing Billy Preservation Society.
CLTB 33
(G33) See Australian Standard Garratt.

Victoria (Puffing Billy Preservation Society):
SAR NGG16 class. 2-6-2+2-6-2. (610 mm gauge).
NG129 BP c/n 7430 1951 From Ixopo Branch SAR (via ACR).

Wales (West Highland Railway):
North East Dundas Tramway Tasmania K class compound. 0-4-0+0-4-0. (610 mm gauge).
K1 BP c/n 5292 1909 Composite of K1 and K2.

Notes: The following Garratts are held in South Africa for a New Zealand owner.
1. SAR GMAM 4135 BP c/n 7850 1958 NB sub c/n 27787 1958 4-8-2-8-4 1067 mm gauge.
2. SAR GMAM 4148 HEN c/n 29607 1954 4-8-2-8-4 1067 mm gauge.
3. NRZ 15th 398 BP c/n 7340 1950 4-6-46-4 1067 mm gauge.

Surviving Australasian Garratts

Sir,

To compliment my table Construction List of Australasian Garratts published in *Garratt Gossip* at p 46 of *AME* no 96 please find below a table of Surviving Australasian Garratts.

There are 11 surviving Australasian Garratts of the 179 Garratts built for commercial use in Australia. Of these 10 are preserved in Australia and 1, a composite of the first two Garratts, North East Dundas Railway K1-K2, is preserved in Wales.

From South Africa 2 Garratts have been imported into Australasia. There are also 2 further South African Garratts and 1 Zimbabwe Garratt held in South Africa for a New Zealand owner. This totals 16 surviving Garratts associated with Australasia.

Live steam modelers may need to see an example of the prototype they wish to model or are currently modeling and the table below may identify where to locate an example. Also hopefully in the future an Australasian Garratts live steam rally may happen and it would be nice to see an example of all the classes represented.

James Tennant
Canberra

Teaching model engineering

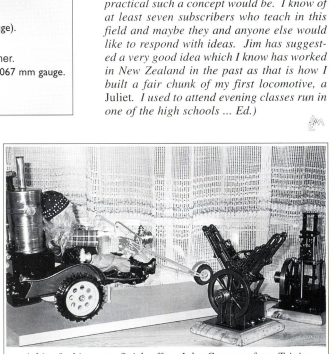
Sir,

A constantly recurring theme in editorials and letters in model engineering magazines is how to attract beginners to the hobby. The established clubs perform a valuable rol in welcoming beginners but many may be inhibited by the high level of expertise of those who have been in the hobby for many years. Another factor acting against new starters is the high cost of setting up a workshop. These factors have been overcome by many who have gone on to enjoy the hobby. However, there are probably many out there who would like to have a go but don't know how to get started.

Could I suggest the model engineering community consider initiating a suitable course for beginners. Most suburbs in the majo cities have community colleges which run a variety of hobby courses. For example, in the Hornsby area of Sydney there are courses in upholstery, woodwork and wood turning. The courses are generally held in local high schools. I would suggest that an introductory course in model engineering in which the participants made a simple stationary steam engine would form an excellent entry into the hobby. A model engineer with some teaching experience would need to be found. A suitable venue would be a high school with metalwork teaching facilities with some lathes. Your magazine and the local model engineering clubs could give publicity.

Jim Thompson
New South Wales

(I am not sure that Jim intended this letter to be published, but I have decided to do so to see how the idea is received and what suggestions may be forthcoming on how practical such a concept would be. I know of at least seven subscribers who teach in this field and maybe they and anyone else would like to respond with ideas. Jim has suggested a very good idea which I know has worked in New Zealand in the past as that is how I built a fair chunk of my first locomotive, a Juliet. *I used to attend evening classes run in one of the high schools ... Ed.)*



A bit of whimsy to finish off — John Carnsew from Trinity Beach in North Queensland wrote in asking for information on the early Stephenson locomotive Locomotion *as he is wishing to build a model. Enclosed with his letter was this photo of some of his work. He says "the gent on the trike has had much larger rear wheels installed since the photo was taken, but the single slide valve does steam up, although compressed air is much preferred as it is nowhere near as disastrous on his whiskers!"*

News Desk

with David Proctor

Thankyou for your responses to pleas for help which I have passed on through this column lately. It's good to see there continue to be model engineers who are willing to help others.

John Peel Video

In the Convention report in the last issue, it was mentioned that a video of the Cobden Convention was available from a chap called John Peel. This information came from one of the members of the Cobden club but from the number of calls I have received it would appear that Mr Peel is either absent or not responding. Unfortunately I have no other information

While talking about the Convention, Peter Lawson has advised that the owner of the row boat on the pond referred to in the report is Greg Waddle from Evandale. Thank you Peter.

AME Retail

AME Retail advise that they have taken delivery of some new videos. The *Darjeeling Himalayan Railway* which was reviewed in the last issue, *Glory of the Past* and *American Railroad Story Down Under* which is a double video cassette story, and most interesting. Prices for these appear in the AME Retail ad on page 67. Also on AME Retail, you will note the **Back Issues** prices have been changed to include GST.

Help wanted — a suggestion

I have received a note from a reader who suggests that we consider a regular (or casual on request) help wanted section in which a photo could be included. As he says, often readers have hand tools, machine tools, etc. that they are unable to identify and the opportunity to display a photo with a request for information might produce the answers and/or the opportunity to exchange details and measurements of missing parts. It could also lead to unknown machine tools of Australian origin being identified before those having the knowledge pass on.

I think the idea is a good one and will provide the space. In the past I have tended to put the odd request in the *Letter Box* section as they have been very few in number. Previous offers of a help section had not received any response — maybe this will be different. Over to you.

Articles

We are starting to run low on the shorter type articles, i.e., 2 pages or less. *(2½ pages of typed text comes to about 1 page in the magazine).* If you would like to contribute, now is a good time.

Sydney 1st - 4th November 2001

Hare & Forbes Annual 4 Day Sale is on again from Thursday 1st throught to Sunday 4th November.
After the success of the previous year's sale, the management and staff are once again extending an invitation to the trade and public to attend this year's event.
Of special interest will include a Model steam engine display, there will also be wood turning demonstrations by a professional woodturner who will be available once again to answer your questions. A complete range of Hafco machinery will be on display, and other attractions will include demonstrations of linishing, welding, air tools and metal machining.
As in previous years, we will have Rotary on board, providing food & refreshments.
Visitors are assured of big discounts on all Hafco equipment.
Hare & Forbes Machinery House
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Classifieds

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- Examples:- lathe, milling, tapping, boring. Casting done to your drawings. Supplier of tools, eg. drills, lathe, milling cutters. For further details write, fax, phone Stephen Palmer, PO Box 95, Windsor NSW 2756. Fax (02) 4571 3270, Phone (02) 4574 0153

5" gauge NSW Z12 loco for sale

- With riding car. New condition. POA. Call Bob (02) 4975 2687

Bunyip castings for sale

- All drawings and castings for *Bunyip* as serialized in AME. Laser cut frames, completely made up with buffers and coupling bars. Wheel blanks. Cost to date $4,000. Unable to continue because of ill health. Will accept $3,500. Contact Tony (03) 9795 3695

7¼" gauge Bo-Bo petrol loco for sale

- Fitted with 9HP Honda motor, hydraulic pump powering 4 motors each directly coupled to an axle. Air compressor to activate brakes on ride truck. New battery supplied. Has had approx. 40 hours of running time. $8,500 no offers. Ph. Stan (07) 5524 5444 anytime.

7¼" gauge all metal straddle type passenger car

- capacity 6 adults, fitted with air-on brakes and latest commercial bogies. (*This car features in this issue on page 30).* $1,800. no offers. Ph. Stan (07) 5524 5444 anytime.

Magazines for sale

- 12 bound volumes of *Live Steam* 1976 to 1987. 1 bound volume of *Best of Live Steam*. $200 the lot. Call Helen (02) 9427 4879

5" gauge 0-6-0 *Midnight* for sale

- Based on *Simplex*, current AMBSC cert. Boiler. Steam turbine generator, steam water pump and many extras. Comes with 2 scale coal wagons utilized for seat, tool box, coal and extra water. 2 passenger trucks all vacuum fail-safe braking system. Whole combination fits custom-built single axle fully enclosed securely locked trailer. A complete and well-built unit right down to special tools, plans and construction manual. Located in Wodonga. $18,000 ono. For further info. Please contact Glenn Roennfeldt 0408 690059 (B) or (02) 6024 5260 (AH).

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- Specializing in Victorian Railways Steam Locomotives, Rolling Stock and Accessories in 5-inch gauge. Currently under construction, or presently available, are Z and ZL Goods Vans, GY's, I and IY's, S and Q Flat Top Bogied wagons, E Steel Bogied Gondolas, K Flat Top wagons, T Goods wagons, Oil and Acid type tankers and P Explosive wagons (others hopefully to be produced soon). All wagons are complete and ready-to-run with individual coding and numbering, auto couplings and air hoses and finished painted in any of the colour schemes used by the Victorian Railways. Now under construction are two (2) Victorian Railways N class 2-8-2 type locomotives in 5-inch gauge, and both will be offered for sale as ready-to-run. For further inquires on our products, or if you would like a copy of our complementary Catalogue, please contact Erik or Dennis at our address by mail, phone, fax or e-mail us at Scale Steam Locomotives & Rolling Stock (reg.) PO Box 492, Daylesford, 3460, Victoria, ph/fax: (03) 5348 4135, e-mail: steamers@netconnect.com.au

Ride-in train, 7¼" gauge for sale

- 7HP water cooled Kubota diesel engine with hydrastatic drive. Train is modeled on a SA Rail 520 engine. Comes with 5 carriages (incl. brake carriage) and approx. 350 metres of rail (rail currently laid). $12,000 Ph. Jim Stevenson (08) 8725 6088 Fax (08) 8723 1044

Internal combustion engine castings

- *Mate* 2cc diesel $75.00, *Titan 60* $85.00, *Chenery* 6.75cc S.V. with gears $200.00, *C.I. Special* with gears $250.00, *Doling 61* $100.00, *Manx 60* with McCoy 60 liner and rings $240.00. Drawings included. All plus postage. Ph. Russell (07) 3378 5378

7¼" gauge Black Five for sale

- Copper boiler, boiler cert. Just renewed, excellent mechanical condition, steel tyres. Sell with steel carrying cradle and workshop trolley. $16,500.00. Ph. (02) 6922 5489 (evenings)

2½" 2-6-0 loco and 6-wheel tender for sale

- OB Bolton's mogul. A piece of history, was a runner, copper boiler, complete, needs some simple assembly, sheet metal work and painting, complete set of drawings (3), $680.00 Brian (02) 9970 8370

Capacity available

- Turning, milling, fabricating, tooling, will tackle anything. Frank Zizza, 6 Elizabeth St., Euroa 3666 (03) 5795 1551

UK *Model Engineers* for sale

- All in good condition. Mixed bundle of 19 copies August 87-June 88, another mix of 9 copies June 83-March 84, bundle of 69 copies Nos 3734-3794 (9 or 10 missing). $1 each. Call Leonard on (07) 5497 5569

7¼" g. diesel outline loco for sale

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Machinists tool chest of eleven drawers, new stained polished wood, brass knobs. Phone for photo, details. $395. Bruce (02) 4868 2030

Magazines for sale *Live Steam* 1976-85, 108 copies, sell as one lot, $1.50 ea, *Engineering in Miniature* vols 1 & 2 and half vol. 3, $50. Eric (02) 9654 9040

Hercus index head 3MT ¾" bore, 24 teeth, index plate, new. $700 (02) 9484 3534

WANTED

5" gauge rolling stock (non-person carrying) also '0' gauge 2-rail track, new or used, any quantity. Details to 'Doc' Wescombe-Down (08) 8271 3066

Copies parts 4 and 5 **construction notes *Centaur*** gas engine from *Model Engineer*, August/September 1957. Thank you. Peter Knight (07) 3265 3620

Bearing metal O.T.L. brand, type P.C. data sheet urgently required or any other info on this material. Please phone (03) 6244 8517

Users **instructions/manual for a six (6) inch Scruttons'** (Bulgarian SOFIA) C8M toolroom lathe. David Dunnet (02) 6286 3704

Authentic **drawings NSW C35** for 5" gauge. Would appreciate any details/help, to copy and return. All costs and care assured. Ph/fax Ross (02) 4959 4052

Magazines — *AME*, *ME* any old issues. Robert Ph. (07) 4633 1526, fax (07) 4633 4377

SWAP

Historic railway journals 1963-81 — *The Railway News*, *Dogspike*, *The Roundhouse* plus many more, for '0' gauge track, rolling stock, etc. Ph/fax 'Doc' Wescombe-Down (08) 8271 3066

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- Only one entry per issue.

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Steam Fever $41.50
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Shows some of the largest steam locomotives in preserved working order on US railways. Incl. Nickel Plate Berkshire 2-8-4 no.765, Norfolk and Western 'J' Class 4-8-4 no.611 and Norfolk and Western 'A' class Mallet no.1218. 1218 footplate and restoration Scenes included.

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A 40 min. EK video look at East German preserved steam at work in revenue service during 1989.

Milestones in Railway Preservation (Australia) $51.50
Written and directed by Graeme Belbin. Qld's 130 year old A10 No.6, to a Victorian R class leading 3 diesels. 3830 and rare archival scenes — tripple headers out of Lithgow in the 1950s and black 3801's supposed last run. Duration: 90min.

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